

TRIP REPORT  
RICHARDSON FLAT TAILINGS SITE  
SUMMIT COUNTY, UTAH  
TDD #T08-9204-015  
PAN EUT0039SBA

PREPARED FOR:

U.S. Environmental Protection Agency  
Region VIII  
Waste Management Division  
Mike Zimmerman, On-Scene Coordinator

PREPARED BY:

Scott Keen  
Ecology and Environment, Inc.  
Technical Assistance Team

DATE SUBMITTED: August 17, 1992

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## 1.0 INTRODUCTION/PURPOSE

As discussed in the Sampling Quality Assurance/Quality Control (QA/QC) Work Plan of May 28, 1992, the objective of recent sampling activities at the Richardson Flat Tailings site was to determine if immediate threats to human health and/or the environment are present. The U.S. Environmental Protection Agency's (EPA) goal is to assure site safety preceding remedial activities. The Work Plan had outlined the following tasks to be accomplished.

1. Air Sampling. Off-site air samples were to be collected for the purpose of assessing the air migration of contaminants from the tailings area.
2. Landfill Assessment. One upgradient and two downgradient monitoring wells were to be sampled and analyzed to determine releases, if any, to groundwater originating from the municipal/sanitary landfill on-site.
3. Tailings Assessment. Depth of soil cover was to be determined via soil borings over a representative portion of the tailings area. Cover soil samples were to be collected and analyzed; and the tailings containment structure was to be examined. Groundwater samples from the tailings dam area were to be collected and analyzed; and surface water samples from Silver Creek and from the diversion ditch through the tailings area were to be sampled and analyzed. Sediment samples were also to be collected from the wetlands area between Silver Creek and the tailings containment structure.

## 2.0 SITE ACTIVITIES

Air sampling was conducted by the Emergency Response Team (ERT) of the U.S. EPA on June 10 and 11, 1992. ERT collected 17 samples from 5 locations over this 2-day period. Each sample was taken over an 8-hour duration. A meteorological station was established during the collection of air samples to record meteorological conditions. Samples are being analyzed for lead, arsenic, cadmium, and zinc.

Monitoring well installation occurred during the week of June 22, 1992. These procedures have been described in the Report of Drilling Activities (July 13, 1992). All other sampling activities have taken place during the week of August 3, 1992.

The TAT and EPA personnel, Mike Zimmerman and Mike McCeney, arrived on-site at 0805 hours on August 4, 1992. During the two and one-half days of on-site activity representatives of United Park City Mines (UPCM) and their consultants, Pioneer Technical Services, were continually present.

On August 4, 1992 all groundwater samples were collected, and the TAT performed its inspection of the tailings containment structure, and a grid system was established on the tailings area. On August 5, 1992

all surface water and sediment samples were collected, and the process of determining depth of cover on the tailings area continued. On August 6, 1992 the TAT completed soil borings and determination of soil cover depth, collected all soil samples, and prepared all samples for shipment to Contract Laboratory Program (CLP) labs. All groundwater, surface water, sediment, and soil samples were "split" with UPCM. The TAT completed work and was off-site at 1245 hours on August 6, 1992. Samples were delivered to the Federal Express office at the Salt Lake City Airport at 1320 hours on August 6, 1992.

### 3.0 SAMPLING SUMMARY

Table 1 is a summary of samples collected on August 4 through 6, 1992. Samples shipped included a double or triple volume of at least one water and soil/sediment sample for laboratory QA/QC procedures, a trip blank for VOC analysis, and rinsate samples. Copies of traffic reports/chain-of-custody records are attached to this report. All samples will be analyzed and data will be reviewed in accordance with the QA-2 level of quality assurance.

Figure 1 shows the approximate location of each water and sediment sample collected during the week of August 3, 1992.

Depth of cover was determined at 29 locations over the tailings area. These locations are depicted on Figure 2. Locations were determined by first establishing a reference line in an approximate direction of northwest to southeast through the tailings area. This reference line includes and is a continuation of a straight portion of the tailings containment structure as shown in Figure 1. This reference line can be visualized in photo number 25, attached to this report. The reference line extends from the base point in photo number 25 in the direction of the road and of the tape measure as seen in photo number 25 toward a small tree at the opposite end of the tailings area. This tree can be seen in photo numbers 25 and 26. It is the easternmost tree of the two trees pictured. Points were marked along this reference line at 200 or 400 foot intervals. At 2800 feet from the base point a second reference line was established in a perpendicular direction to the first reference line. This second reference line extended in an approximate direction from southwest to northeast. For the purpose of sampling or soil cover measurements, all locations within the tailings area were identified relative to these two reference lines. For example, a sample location identified as 1900, 800L would be 1900 feet from the base point (using the first reference line) and 800 feet to the left (northeast) using the second reference line.

Sample locations were on an approximate grid pattern of 400 feet x 400 feet. The grid covered most of the tailings area. Table 2 presents the results of cover depth measurements. At all but one location a distinct line could be seen between soil cover and gray colored tailings beneath the cover. Photo number 29 is an example of the distinct layering that was visible. X-ray fluorescence (XRF) measurements for lead were taken to confirm the visual determination of cover depth or to determine cover depth where a distinct line was not visible.

As seen in Table 2, much of the tailings area is covered with a "salt grass". This is a native grass which appeared to form an excellent cover on the tailings. Roots of the salt grass extended five to six inches below ground surface. The grass itself formed an effective mat on top of the tailings. It is important to note that the salt grass became established in this area when tailings were still being slurried to the site. When the site was active, much of the area was under water. Now that the site is inactive and standing water does not occur, even seasonally, will the salt grass disappear?

Figure 2 also shows locations where cover samples were collected for laboratory analysis. These samples were surface samples taken after scraping away the top one-half inch of cover. From XRF measurements it was clear that a slight amount of tailings material had been carried by the wind and covered much of the site.

Following are deviations from the Work Plan of May 28, 1992 in terms of actual samples collected versus proposed samples in the the Work Plan.

1. Three monitoring wells near the landfill were not sampled.
2. Three monitoring wells at the base of the tailings dam were not sampled. There are five monitoring wells in this location; only two were sampled. The three wells were not sampled due to inadequate recharge; i.e., after purging it was impossible to collect enough water for a sample.
3. Two of the four proposed surface water samples from the diversion ditch were not collected because of inadequate flow.
4. Twenty-nine, rather than twenty (proposed), locations on top of the tailings area were examined for depth of cover.
5. Six, rather than ten (proposed), cover soil samples were collected.
6. No opportunity samples were collected.

#### 4.0 SURFACE WATER AND GROUND WATER QUALITY CRITERIA

The Utah Code, 26-11-2 through 20, has classified the Weber River from the Stoddard diversion to the headwaters (including Silver Creek) in the following manner: IC-protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health; 3A-protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain; and 4-protected for agricultural uses including irrigation of crops and stock waterings. The Utah Code establishes specific numeric criteria for contaminants based upon use classification. These regulations/criteria are attached to this report.

The Utah Code also establishes classes of ground water for which quality criteria apply. At this site, the background monitoring well (RF-GW-04) will be used to determine the ground water class for the site. Water quality data for downgradient wells can be compared to the background well to determine if the protection level for the appropriate groundwater class has been exceeded.

Federal quality criteria for water are presented in the "Gold Book". These criteria, unlike the State criteria, are not regulatory standards. They are guidelines only for the protection of aquatic life and human health. Both State and Federal water quality criteria or standards will be reviewed and compared to surface water and ground water quality data that is received as a result of this recent sampling activity.

TABLE 1  
SAMPLE SUMMARY  
AUGUST 4, 5, 6, 1992  
RICHARSON FLAT TAILINGS SITE  
TDD #T08-9204-015

MATRIX	SAMPLE LOCATION	ANALYSIS
Groundwater	RF-GW-04	Metals (Total and Dissolved)
	RF-GW-05	Metals (Total and Dissolved)
	RF-GW-09	Metals (Total and Dissolved)
Surface Water	RF-SW-01	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-02	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-03	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-04	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-05	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-06	Metals (Total), VOC, BNA, Pesticide/PCB
	RF-SW-07	Metals (Total)
	RF-SW-08	Metals (Total)
Sediment	RF-SE-01	Metals (Total)
	RF-SE-02	Metals (Total)
	RF-SE-03	Metals (Total)
	RF-SE-04	Metals (Total)
Soil	RF-SO-01	Metals (Total)
	RF-SO-02	Metals (Total)
	RF-SO-03	Metals (Total)
	RF-SO-04	Metals (Total)
	RF-SO-05	Metals (Total)
	RF-SO-06	Metals (Total)

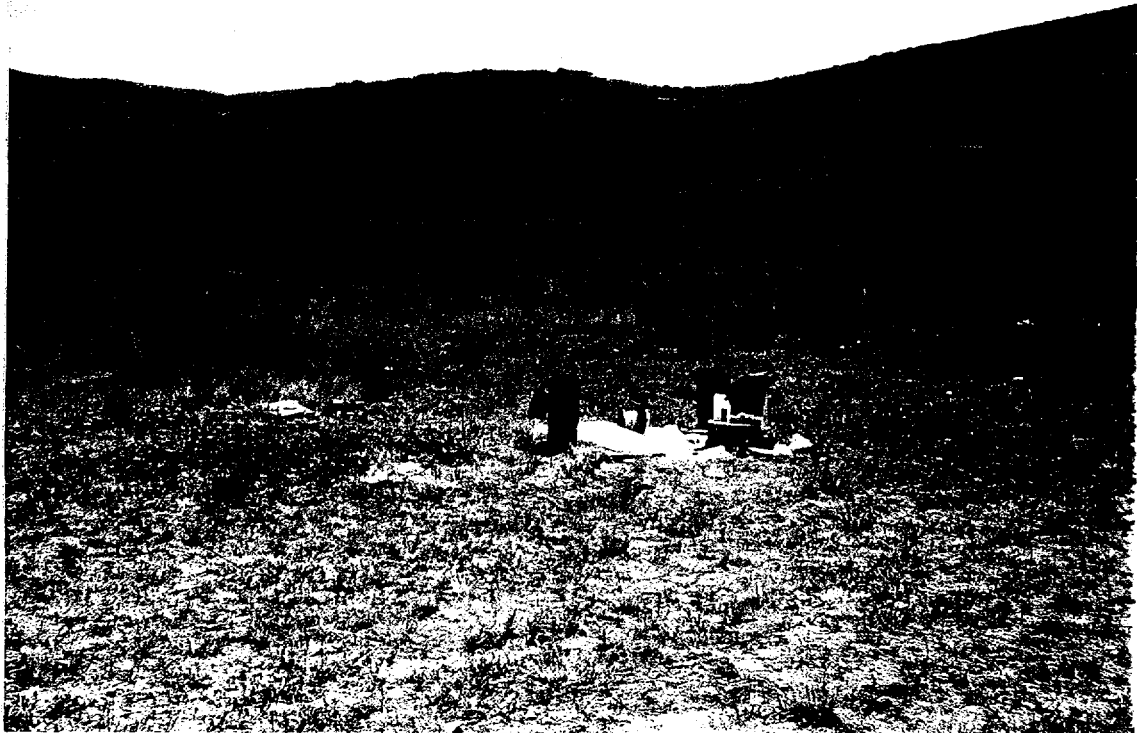
TABLE 2  
COVER DEPTH MEASUREMENT  
RICHARDSON FLAT TAILINGS SITE  
TDD #T08-9204-015

LOCATION	DEPTH OF COVER	VISUAL CONFIRMATION	XRF CONFIRMATION	XRF SAMPLE NUMBERS
200, 0L	10"	Yes	Yes	RF020, 021
600, 0L	3-6"	Yes	Yes	RF022,023,024,025
1000, 0L	>18"			
1400, 0L	>18"			
1800, 0L	>18"			RF026
2200, 0L	0-6"	No	Yes	RF027,028,029,030
2600, 0L	6-10"	Yes	Yes	RF032,033,034,035
2380, 400L	8-9"	Yes	Yes	RF036,037,038,039
1928, 400L	5-6"	Yes	Yes	RF040,041,042
1516, 400L	>6"			
1119, 400L	4"	Yes	Yes	RF044,045
737, 400L	7-8"	Yes	Yes	RF048,049,050
330, 400L	8"	Yes	Yes	RF055,056
2800, 800L	No Cover (Salt Grass)	Yes	Yes	RF057,058,059,060
2571, 800L	No Cover (Salt Grass)	Yes	Yes	RF061,062
2215, 800L	No Cover (Salt Grass)	Yes	Yes	RF063,064
1785, 800L	No Cover (Salt Grass)	Yes	Yes	RF065,066
1407, 800L	3"	Yes	Yes	RF067,068,069
945, 800L	6-7"	Yes	Yes	RF071,072,073
531, 800L	7-8"	Yes	Yes	RF074,075
166, 800L	No Cover	Yes	Yes	RF076,077
130, 400L	2"	Yes	Yes	RF080,081,082
-70, 400L	6.5"	Yes	Yes	RF083,084,085
-70, 600L	11"	Yes	Yes	RF086,087,088,089
2000, 1200L	No Cover (Salt Grass)	Yes	Yes	Rf091,092
2400, 1200L	No Cover (Salt Grass)	Yes	Yes	RF093,094
2800, 1200L	No Cover (Salt Grass)	Yes	Yes	RF095,096
3200, 1200L	No Cover (Salt Grass)	Yes	Yes	RF097,098
3400, 1200L	>10"	Yes	Yes	RF099,100





**APPENDIX A**  
**PHOTODOCUMENTATION**



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Monitoring well #4, background sample taken from this location  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 4, 1992 Time: 1240 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Monitoring well #4, damaged with bullet holes, inner casing was  
damaged and cap was missing  
Location: Richardson Flats

City: Park City County: Summit State: UT  
Date: August 4, 1992 Time: 1247 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Monitoring well #4 as found upon arrival on-site

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1248 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Setting up to collect samples from monitoring well #8; photo  
overlooking wetlands from tailings dam  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 4, 1992 Time: 1420 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Parking vehicles on top of tailings dam; plants growing on  
capped tailings  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 4, 1992 Time: 1440 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Preparing to collect samples from monitoring well #5

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1510 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA





OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Clean nylon rope was dedicated to each purging and sampling well

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1517 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Purging monitoring well #9

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1620 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Groundwater samples from monitoring well #9

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1655 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Total amount of water purged from monitoring well #7; due to low  
volume, slow recharge, and volume requirements for samples, GW-6, GW-7,  
and GW-8 were not collected

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 1727 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collecting SW-6 VOA sample from Silver Creek

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0825 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Sample SW-6 collected upstream of where sampler stands

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0826 Hours

Photographer: Chuck Baker

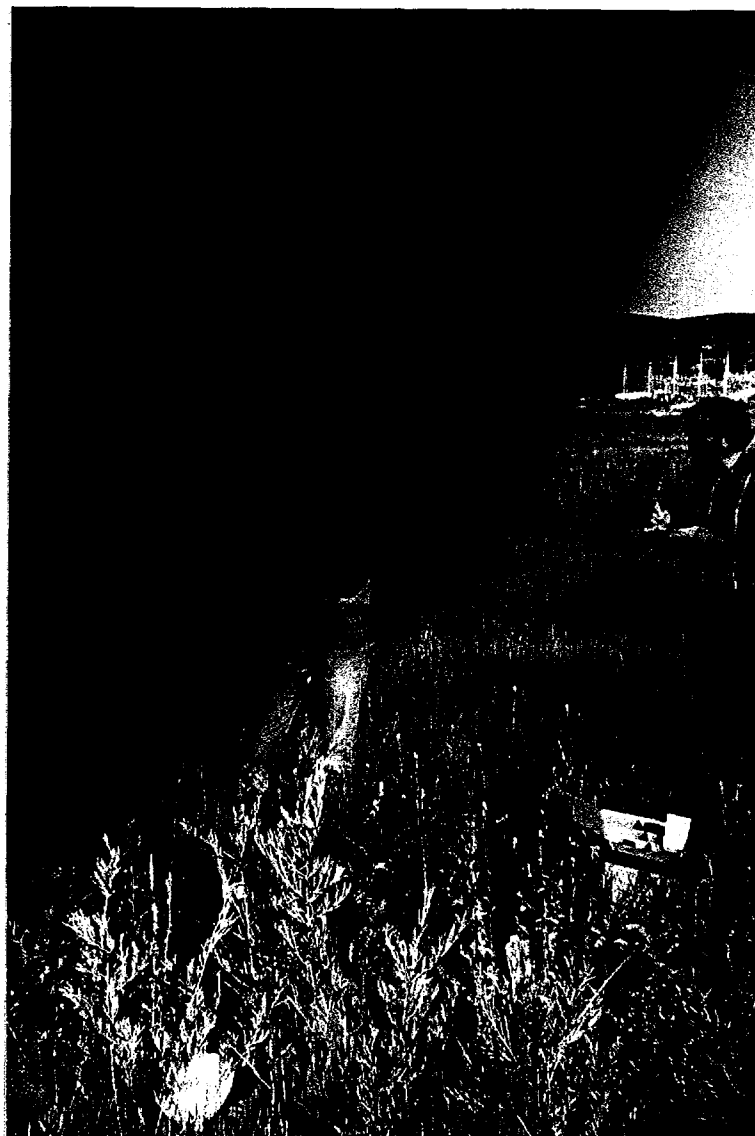
Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collecting SW-6

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0828 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collecting SW-5

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0844 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

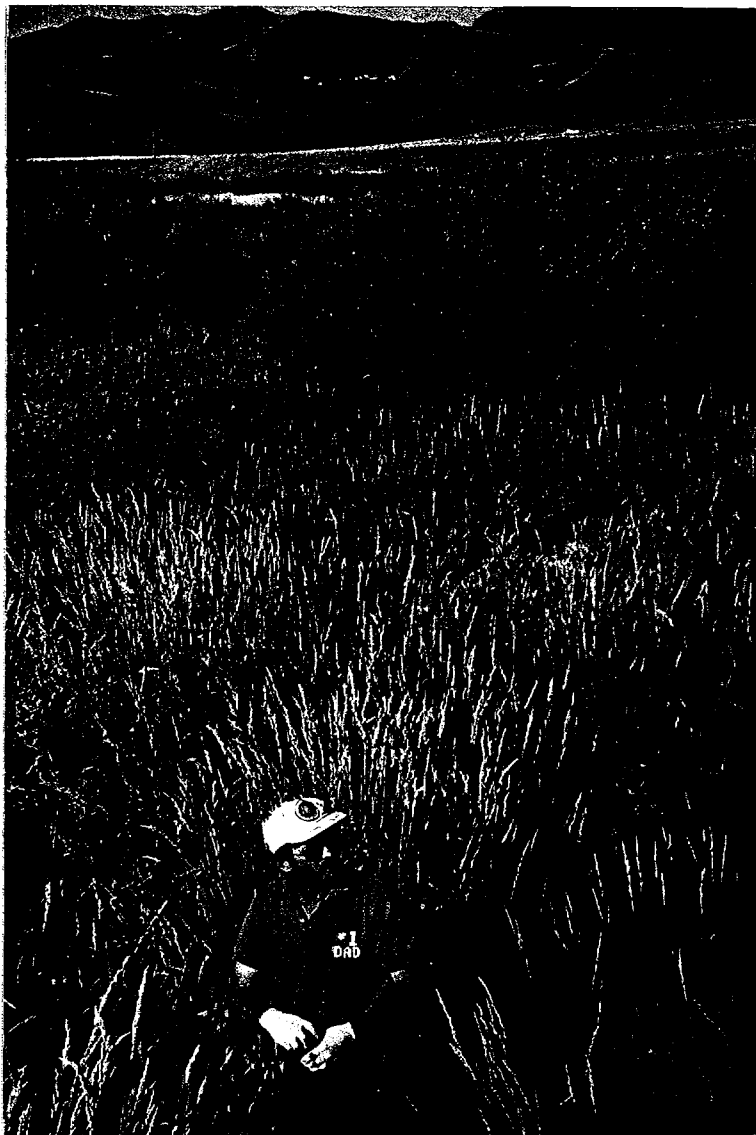
File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA





OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Sample collection from SW-05

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0850 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collection of VOA samples from SW-4

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0908 Hours

Photographer: Chuck Baker

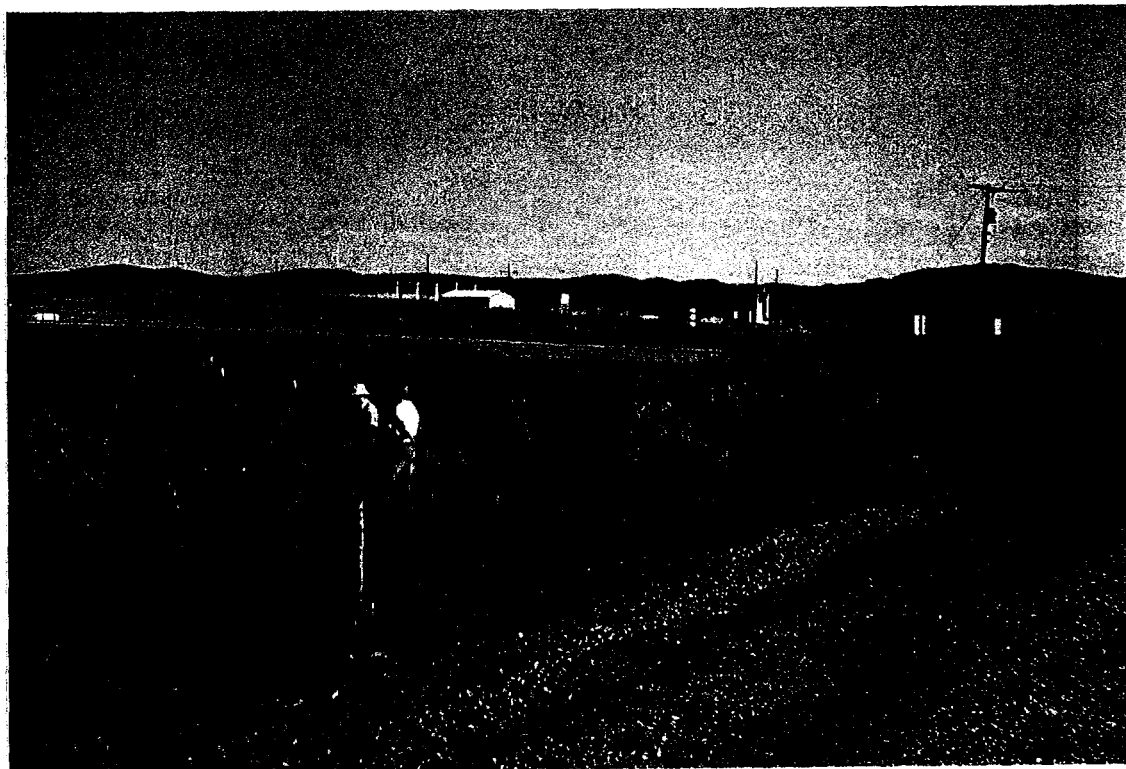
Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collection of samples from SW-4

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0913 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Sample location SW-3; note tailings uncovered in background

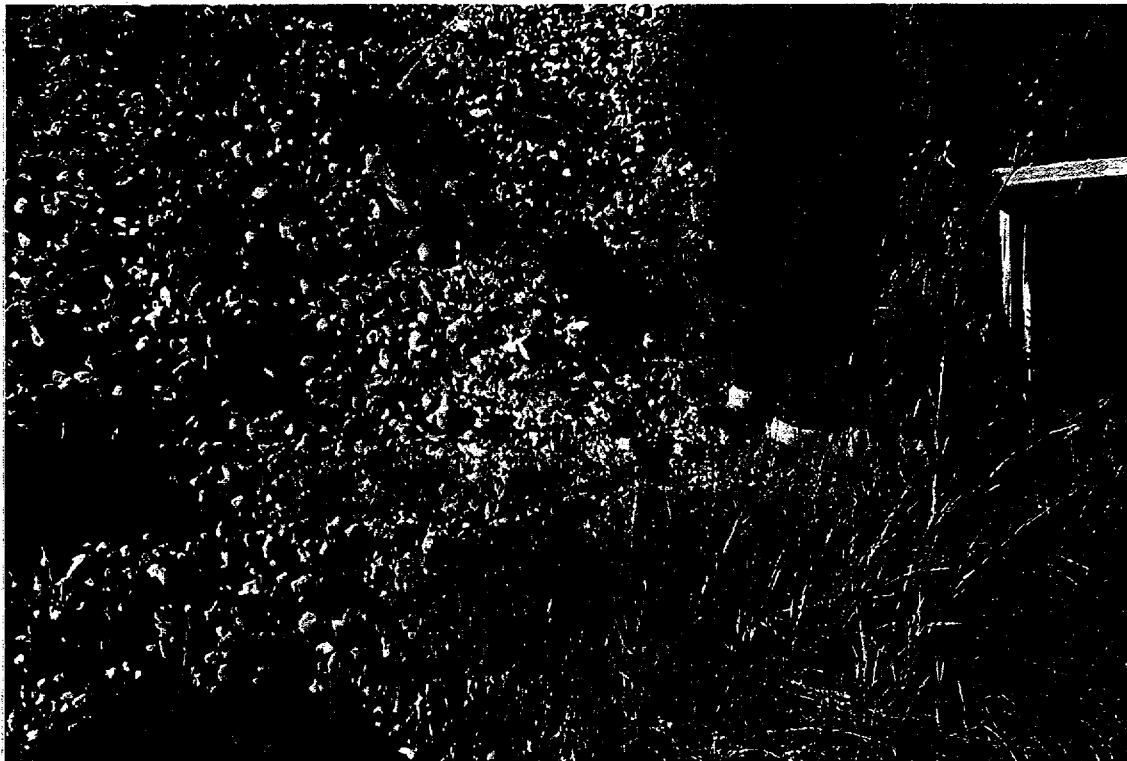
Location: Richardson Flats

City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0924 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Because of low volume of surface water, a clean cutoff poly  
container was used to transfer surface water  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0926 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Tailings just outside of rail bed near SW-3

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0927 Hours

Photographer: Chuck Baker

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

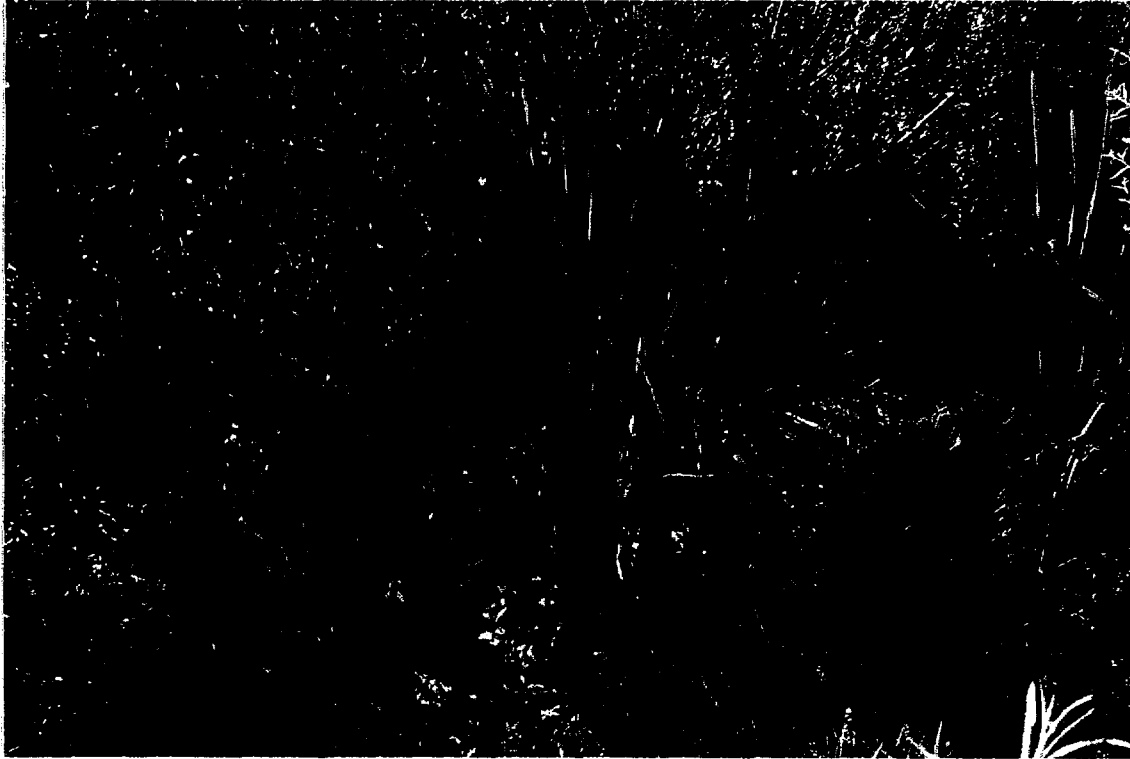
Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collecting SW-7 from just below the near stagnant pool  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0944 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Near stagnant pool just upstream from SW-7

Location: Richardson Flats

City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0945 Hours  
Photographer: Chuck Baker  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: TOB-9204-015  
Witness: Jeff Fleming  
Process: C-41  
Paper: AGFA





OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Collecting sample SW-2; note tailings around sample location

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 1000 Hours

Photographer: Chuck Baker

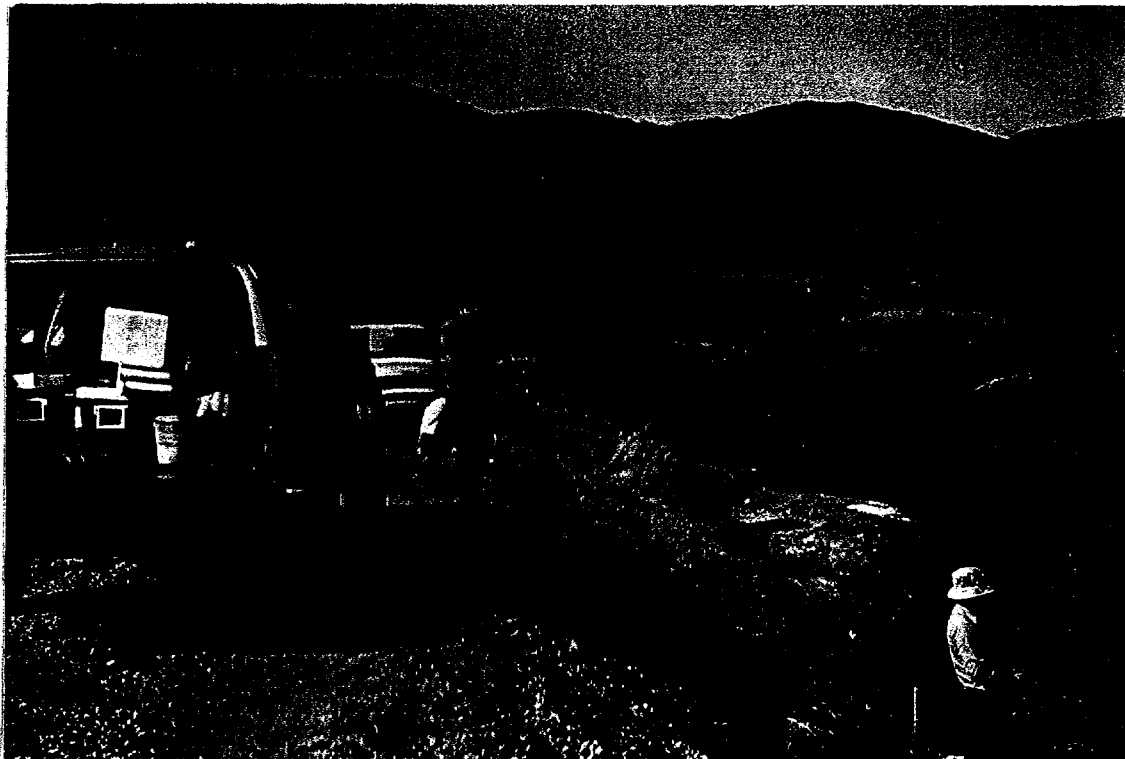
Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Sample location SW-2

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 1002 Hours

Photographer: Chuck Baker

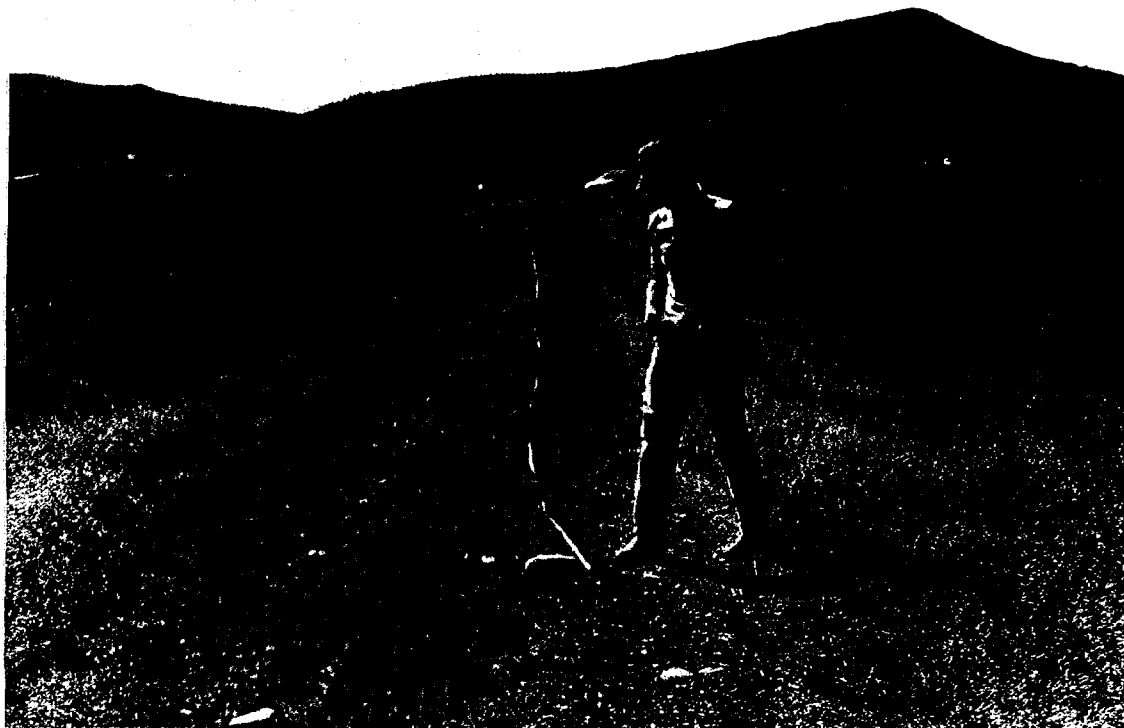
Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Jeff Fleming

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Base point and reference line (OL) for grid of tailings area

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 4, 1992 Time: 0905 Hours

Photographer: Scott Keen

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Katherine Romine

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: South end of reference line (OL)

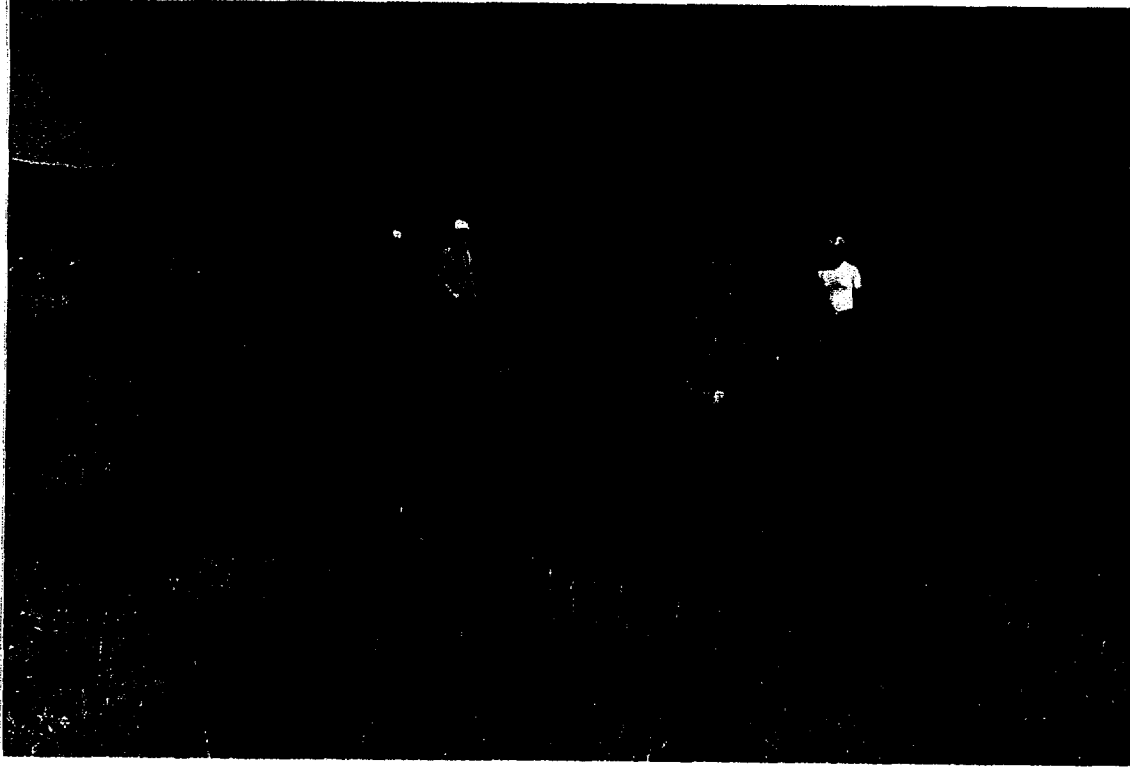
Location: Richardson Flats

City: Park City County: Summit State: UT  
Date: August 4, 1992 Time: \_\_\_\_\_ Hours  
Photographer: McCeney  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Romine  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Power auger was necessary to measure depth of cover at some  
points  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0740 Hours  
Photographer: Scott Keen  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Katherine Romine  
Process: C-41  
Paper: AGFA

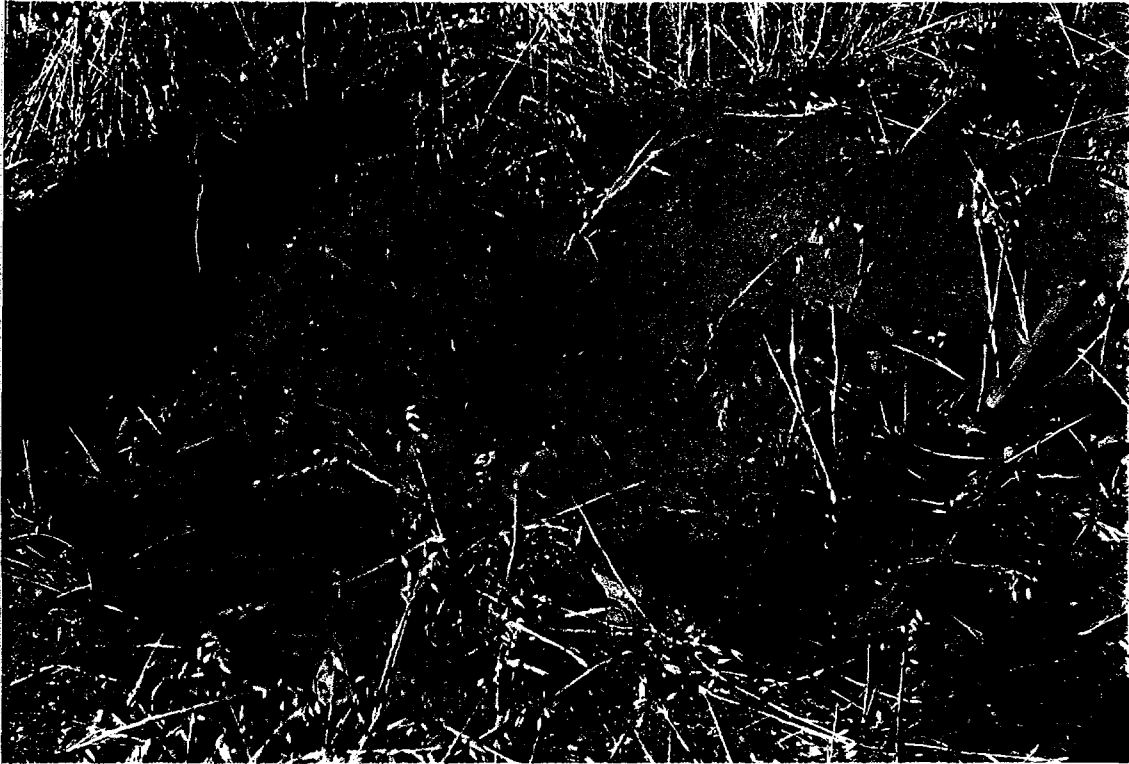


OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Location 2400, 400L; this location was surrounded by uncovered tailings

Location: Richardson Flats

City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 0935 Hours  
Photographer: Scott Keen  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Katherine Romine  
Process: C-41  
Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Location 2000, 400L; note distinct line of cover/tailings at  
five to six inches

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 0950 Hours

Photographer: Scott Keen

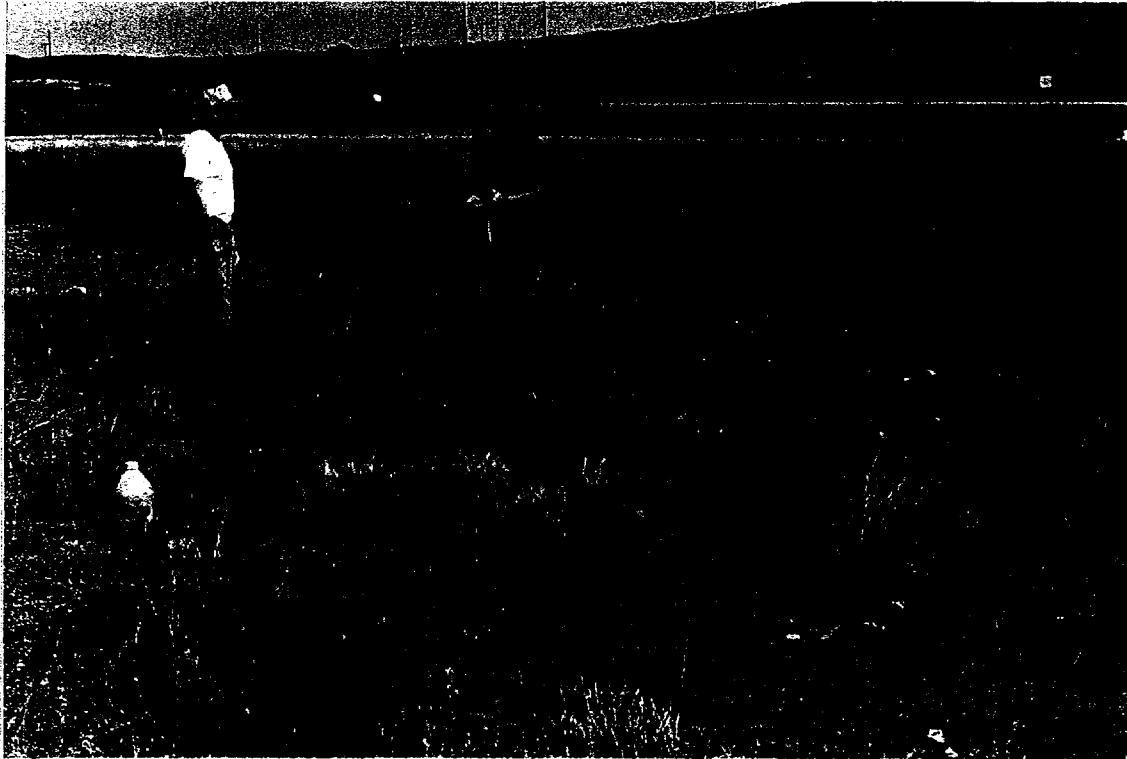
Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Katherine Romine

Process: C-41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Location 1119, 400L; note gray areas of exposed tailings

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 1030 Hours

Photographer: Scott Keen

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08-9204-015

Witness: Katherine Romine

Process: C-41

Paper: AGFA





OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Location 737, 400L

Location: Richardson Flats

City: Park City County: Summit State: UT

Date: August 5, 1992 Time: 1200 Hours

Photographer: Scott Keen

Film: Kodak ASA: 200 Location of Negative: EPA-ERB

File: T08 9204 015

Witness: Eatherine Romine

Process: C 41

Paper: AGFA



OFFICIAL PHOTOGRAPH  
ENVIRONMENTAL PROTECTION AGENCY

Subject: Facing south at support structure for slurry pipeline across  
the diversion ditch  
Location: Richardson Flats  
City: Park City County: Summit State: UT  
Date: August 5, 1992 Time: 1444 Hours  
Photographer: Scott Keen  
Film: Kodak ASA: 200 Location of Negative: EPA-ERB  
File: T08-9204-015  
Witness: Katherine Romine  
Process: C-41  
Paper: AGFA

**APPENDIX B**  
**TRAFFIC REPORTS/CHAIN-OF-CUSTODY RECORDS**



United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Organic Toxic Report & Chain of Custody Record

(For Organic CLP Analysis)

No. 1  
(if applicable)

Case No.

18565

1. Project Code <b>T089204015</b>	Account Code <b>EUT0039SBA</b>	2. Region No. <b>VIII</b>	Sampling Co. <b>E+E, INC</b>	4. Date Shipped <b>8/6/92</b>	Carrier <b>FED EX</b>	6. Preservative (Enter in Column D)  1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Other (SAS) (Specify) 6. Ice only N. Not preserved	7. Sample Description (Enter in Column A)  1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>CHARLES W. BAKER</b>		Airbill Number <b>419 238 56 91</b>			
Non-Superfund Program <b>_____</b>		Sampler Signature <i>Charles W. Baker</i>		5. Ship To <b>SWOK</b> <b>Southwest Labs of Oklahoma</b> <b>1700 W. Albany, Ste "C"</b> <b>Broken Arrow, OK 74012</b> <b>(918) 251 2858</b> <b>ATTN: MISSY HAMBY</b>			
Site Name <b>RICHARDSON FLAT</b>		3. Type of Activity Lead <input checked="" type="checkbox"/> Pre-Remedial <input type="checkbox"/> RIFS <input type="checkbox"/> CLEM <input type="checkbox"/> SF <input type="checkbox"/> PA <input type="checkbox"/> RA <input type="checkbox"/> REMA <input type="checkbox"/> PRP <input type="checkbox"/> SSI <input type="checkbox"/> O&M <input type="checkbox"/> REM <input type="checkbox"/> ST <input type="checkbox"/> LSI <input checked="" type="checkbox"/> NPLD <input type="checkbox"/> OIL <input type="checkbox"/> FED <input type="checkbox"/> UST <input type="checkbox"/>					
City, State <b>PARK CITY, UT</b>		Site Spill ID <b>_____</b>					

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E RAS Analysis				F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Designated Field QC
					VOA	BNA	Pest/ PCB	High ARO/ TOX						
<del>HJ687</del>	<del>2</del>	<del>L</del>	<del>G</del>	<del>N</del>		<input checked="" type="checkbox"/>			<del>8-20137</del>	<del>RF-6W-22</del>			<del>MHT 903</del>	<del>cwb</del>
<del>HJ687</del>	<del>2</del>	<del>L</del>	<del>G</del>	<del>N</del>			<input checked="" type="checkbox"/>		<del>8-20138</del>	<del>RF-6W-22</del>			<del>MHT 903</del>	<del>cwb</del>
HJ689	1	L	G	N	<input checked="" type="checkbox"/>				8-20150	RF-SW-02	8/5/92 1445	cwb	MHT 912	
HJ689	1	L	G	N		<input checked="" type="checkbox"/>			8-63034	RF-SW-02	8/5/92 1445	cwb	MHT 912	
HJ689	1	L	G	N			<input checked="" type="checkbox"/>		8-63035	RF-SW-02	8/5/92 1445	cwb	MHT 912	
HJ695	1	L	G	N	<input checked="" type="checkbox"/>				8-63037	RF-SW-03	8/5/92 0924	cwb	MHT 913	
HJ695	1	L	G	N		<input checked="" type="checkbox"/>			8-63038	RF-SW-03	8/5/92 0924	cwb	MHT 913	

Shipment for Case complete? <input checked="" type="checkbox"/> (Y/N)	Page 1 of <b>2</b>	Sample used for a spike and/or duplicate <b>HJ-688</b>	Additional Sampler Signatures - <i>William J. Fleming</i>	Chain of Custody Seal Number <b>_____</b>
---	--------------------	---	--	--

## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <i>C.W. Baker</i>	Date / Time <b>8/6/92 1330</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

Split Samples ☐ Accepted (Signature)  
☐ Declined

0016249



United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Organic Traffic Report & Chain of Custody Record

(For Organic CLP Analysis)

SAS No.  
(if applicable)

Case No.

18565

1. Project Code <b>T089204015</b>	Account Code <b>EUT0039SBA</b>	2. Region No. <b>VIII</b>	Sampling Co. <b>E+E, INC</b>	4. Date Shipped <b>8/6/92</b>	Carrier <b>FEDEX</b>	6. Preservative (Enter in Column D)  1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Other (SAS) (Specify) 6. Ice only N. Not preserved	7. Sample Description (Enter in Column A)  1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>CHARLES W. BAKER</b>		Airbill Number <b>419 238 5691</b>			
Non-Superfund Program <b>-</b>		Sampler Signature <i>Charles W. Baker</i>		5. Ship To <b>SWOK Southwest Labs of Oklahoma 1700 W. Albany, Suite "2C" Broken Arrow, OK 74012 (918) 251 2858</b>			
Site Name <b>RICHARDSON FLAT</b>		3. Type of Activity Lead <input type="checkbox"/> Pre-Remedial <input type="checkbox"/> Remedial <input type="checkbox"/> Removal <input type="checkbox"/> SF <input type="checkbox"/> RIFS <input type="checkbox"/> CLEM <input type="checkbox"/> PRP <input type="checkbox"/> PA <input type="checkbox"/> RD <input type="checkbox"/> REMA <input type="checkbox"/> ST <input type="checkbox"/> SSI <input type="checkbox"/> RA <input type="checkbox"/> REM <input type="checkbox"/> FED <input type="checkbox"/> LSI <input type="checkbox"/> O&M <input type="checkbox"/> OIL <input type="checkbox"/> <input checked="" type="checkbox"/> NPLD <input type="checkbox"/> UST <input type="checkbox"/>		1700 W. Albany, Suite "2C" Broken Arrow, OK 74012 (918) 251 2858 <b>ATTN: MISSY HAMBY</b>			
City, State <b>PARK CITY, UT</b>		Site Spill ID					

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E RAS Analysis				F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Designated Field QC
					VOA	BNA	Pest/PCB	High ARO/TOX						
HJ695	1	L	G	N			<input checked="" type="checkbox"/>		8-63039	RF-SW-03	8/5/92 0924	CWB	MHT 913	
HK250	1	L	G	N	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		8-63041	RF-SW-04	8/5/92 0910	CWB	MHT 914	
HK250	1	L	G	N		<input checked="" type="checkbox"/>			8-63042	RF-SW-04	8/5/92 0910	CWB	MHT 914	
HK250	1	L	G	N			<input checked="" type="checkbox"/>		8-63043	RF-SW-04	8/5/92 0910	CWB	MHT 914	
HK251	1	L	G	N	<input checked="" type="checkbox"/>				8-63045	RF-SW-05	8/5/92 0844	CWB	MHT 915	
HK251	1	L	G	N		<input checked="" type="checkbox"/>			8-63046	RF-SW-05	8/5/92 0844	CWB	MHT 915	
HK251	1	L	G	N			<input checked="" type="checkbox"/>		8-63047	RF-SW-05	8/5/92 0844	CWB	MHT 915	
HK252	1	L	G	N	<input checked="" type="checkbox"/>				8-63049	RF-SW-06	8/5/92 0825	CWB	MHT 916	
HK252	1	L	G	N		<input checked="" type="checkbox"/>			8-63050	RF-SW-06	8/5/92 0825	CWB	MHT 916	
HK252	1	L	G	N			<input checked="" type="checkbox"/>		8-63222	RF-SW-06	8/5/92 0825	CWB	MHT 916	
Shipment for Case complete? (Y/N)		Page 2 of 2		Sample used for a spike and/or duplicate <b>HJ-688</b>				Additional Sampler Signatures <i>William J. Fleming</i>		Chain of Custody Seal Number				

## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <i>C. W. Baker</i>	Date / Time <b>8/6/92 1334</b>	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

EPA Form 9110-2 (Rev. 5-91) Replaces EPA Form (2075-7), previous edition which may be used

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Split Samples ☐ Accepted (Signature)

☐ Declined

0016248



United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Organic Toxic Report & Chain of Custody Record

(For Organic CLP Analysis)

SAS No.  
(if applicable)

Case No.

18565

1. Project Code <b>T089204015</b>		Account Code <b>EUT0039SBA</b>		2. Region No. <b>VIII</b> Sampling Co. <b>E+E, INC</b>		4. Date Shipped <b>8/6/92</b> Carrier <b>FED EX</b>		6. Preservative (Enter in Column D)  1. HCl 2. HNO <sub>3</sub> 3. NaHSO <sub>4</sub> 4. H <sub>2</sub> SO <sub>4</sub> 5. Other (SAS) (Specify) 6. Ice only N. Not preserved		7. Sample Description (Enter in Column A)  1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)				
Regional Information <b>DENVER, CO</b>				Sampler (Name) <b>CHARLES W. BAKER</b>		Airbill Number <b>419 2385691</b>								
Non-Superfund Program				Sampler Signature <i>Charles W. Baker</i>		5. Ship To <b>SWOK Southwest Labs of Oklahoma 1700 W. Albany, Suite "C" Broken Arrow, OK 74012 (918) 251 2858</b>								
Site Name <b>RICHARDSON FLAT</b>				3. Type of Activity Lead <input type="checkbox"/> Pre-Remedial <input checked="" type="checkbox"/> Remedial <input type="checkbox"/> Removal <input type="checkbox"/> SF <input type="checkbox"/> PA <input type="checkbox"/> RIFS <input type="checkbox"/> CLEM <input type="checkbox"/> PRP <input type="checkbox"/> RA <input type="checkbox"/> REMA <input type="checkbox"/> ST <input type="checkbox"/> SSI <input type="checkbox"/> RA <input type="checkbox"/> REM <input type="checkbox"/> FED <input type="checkbox"/> LSI <input type="checkbox"/> NPLD <input type="checkbox"/> OIL <input type="checkbox"/> UST <input type="checkbox"/>		5. Ship To <b>SWOK Southwest Labs of Oklahoma 1700 W. Albany, Suite "C" Broken Arrow, OK 74012 (918) 251 2858</b>								
City, State <b>PARK CITY, UT</b>				Site Spill ID		ATTN: MISSY HAMBY								
CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis VOA BNA Pest/PCB High ARO/TOX				F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Designated Field QC
<del>HJ 687</del>	<del>2</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-20137</del>	<del>RF-GW-22</del>			<del>MHT 903</del>	<del>SE</del>	
<del>HJ 687</del>	<del>2</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-20138</del>	<del>RF-GW-22</del>			<del>MHT 903</del>	<del>SE</del>	
HJ 688	12 <sub>SK</sub>	L	G	N	✓			8-20146 8-63232 8-63233	RF-SW-01	8/5/92 1043	CWB	MHT 911		
HJ 688	12 <sub>SK</sub>	L	G	N	✓			8-20147 8-63234 8-63235	RF-SW-01	8/5/92 1043	CWB	MHT 911		
HJ 688	12 <sub>SK</sub>	L	G	N	✓			8-20148 8-63236 8-63237	RF-SW-01	8/5/92 1043	CWB	MHT 911		
<del>HJ 689</del>	<del>1</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-20150</del>	<del>RF-SW-02</del>			<del>MHT 912</del>	<del>SE</del>	
<del>HJ 689</del>	<del>1</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-63034</del>	<del>RF-SW-02</del>			<del>MHT 912</del>	<del>SE</del>	
<del>HJ 689</del>	<del>1</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-63035</del>	<del>RF-SW-02</del>			<del>MHT 912</del>	<del>SE</del>	
<del>HJ 695</del>	<del>1</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-63037</del>	<del>RF-SW-03</del>			<del>MHT 913</del>	<del>SE</del>	
<del>HJ 695</del>	<del>1</del>	<del>L</del>	<del>G</del>	<del>N</del>	<del>✓</del>			<del>8-63038</del>	<del>RF-SW-03</del>			<del>MHT 913</del>	<del>SE</del>	
Shipment for Case complete? (Y/N)		Page <b>2</b> of <b>2</b>		Sample used for a spike and/or duplicate <b>HJ-688</b>				Additional Sampler Signatures <i>William J. Fleming</i>				Chain of Custody Seal Number		

## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <b>C. W. Baker</b>	Date / Time <b>8/6/92 1334</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

EPA Form 9110-2 (Rev. 5-91) Replaces EPA Form (2075-7), previous edition which may be used

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Split Samples ☐ Accepted (Signature)  
☐ Declined

0016247



United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Organic Toxic Report & Chain of Custody Record

(For Organic CLP Analysis)

Case No.  
(if applicable)

Case No.

18565

1. Project Code <b>T089204015</b>	Account Code <b>EUT0439SBA</b>	2. Region No. Sampling Co. <b>VIII E&amp;E, INC</b>	4. Date Shipped Carrier <b>8/6/92 FEDEX</b>	6. Preservative (Enter in Column D)  1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Other (SAS) (Specify) 6. Ice only N. Not preserved	7. Sample Description (Enter in Column A)  1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>CHARLES BAKER</b>		Airbill Number <b>419 238 5691</b>	
Non-Superfund Program <b>—</b>		Sampler Signature <b>Charles W. Baker</b>		5. Ship To <b>SWOK SOUTHWEST LABS OF OKLAHOMA 1700 W. ALBANY, SUITE 2C BROKEN ARROW, OK 74012 (918) 251-2850</b>	
Site Name <b>RICHARDSON FLAT</b>		3. Type of Activity Remedial Lead <input checked="" type="checkbox"/> Pre-Remedial <input type="checkbox"/> SF <input checked="" type="checkbox"/> PRP <input type="checkbox"/> ST <input type="checkbox"/> FED <input type="checkbox"/> RIFS <input type="checkbox"/> RD <input type="checkbox"/> RA <input type="checkbox"/> O&M <input type="checkbox"/> NPLD <input type="checkbox"/> CLEM <input type="checkbox"/> REMA <input type="checkbox"/> REM <input type="checkbox"/> OIL <input type="checkbox"/> UST <input type="checkbox"/>			
City, State <b>PARK CITY, UT</b>		Site Spill ID <b>—</b>			

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis				F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Designated Field QC
					VOA	BNA	Pest/PCB	High ARO/TOX						
HK 253	4	L	G	N	✓				8-63246	RF-RS-01	8/5/92 1110	CWB	MHT 926	
HK 254	1	L	G	N	✓				8-62119	RF-TB-01	8/6/92 1125	CWB	—	

Shipment for Base complete? <b>(CN)</b>	Page 1 of <b>2</b>	Sample used for a spike and/or duplicate <b>HJ-688</b>	Additional Sampler Signatures	Chain of Custody Seal Number
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## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <b>C.W. Baker</b>	Date / Time <b>8/6/92 1330</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

EPA Form 9110-2 (Rev. 5-91) Replaces EPA Form (2075-7), previous edition which may be used  
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Split Samples ☐ Accepted (Signature)  
☐ Declined

0016250



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Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Inorganic Toxic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No.  
(if applicable)

Case No.

18565

1. Project Code <b>T089244615</b>	Account Code <b>EUT 0439584</b>	2. Region No. <b>VIII</b>	Sampling Co. <b>E&amp;E - INC</b>	4. Date Shipped <b>8/6/92</b>	Carrier <b>FEDEX</b>	6. Preservative (Enter in Column D) 1. HCl 2. HNO3 3. NaOH 4. H2SO4 5. K2CR2O7 6. Ice only 7. Other (SAS) (Specify) N. Not preserved	7. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>CHARLES W. BAKER</b>		Airbill Number <b>4188577315</b> <b>4192385691</b>			
Non-Superfund Program		Sampler Signature <i>Charles W. Baker</i>		5. Ship To <b>H2M INC</b> <b>575 BROAD HOLLOW RD</b> <b>MELVILLE, NY 11747</b> <b>(516) 694-3440</b> <b>ATTN: SAMPLE CUSTODIAN</b>			
Site Name <b>RICHARDSON FLATS</b>		4. Type of Activity Remedial Lead Pre-Remedial SF PRP ST FED					
City, State <b>PARK CITY, VT</b>		Site Spill ID					

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis						F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
					Total	Dissolved	Cyanide	Nitrate/Nitrite	Fluoride	pH	Conductivity					
MHT 905	2	L	G	2	X							8-20140	RF6W-04	8/4/92 1208	WR	
MHT 905	2	L	G	2	X							8-63240	RF6W-04	8/4/92 1215	WR	
MHT 906	2	L	G	2	X							8-20141	RF-6W-05	8/4/92 1535	WR	
MHT 906	2	L	G	2	X							8-63241	RF-6W-05	8/4/92 1535	WR	
MHT 910	2	L	G	2	X							8-20145	RF-6W-09	8/4/92 1650	WR	
MHT 910	2	L	G	2	X							8-63245	RF-6W-09	8/4/92 1715	WR	
MHT 926	4	L	G	2	X							8-63247	RF-RS-01	8/5/92 1110	WR HK253	
MHT 927	5	L	G	N	X							8-63248	RF-SO-01	8/6/92 0912	SK	
MHT 928	5	L	G	N	X							8-63249	RF-SO-02	8/6/92 0925	SK	
MHT 929	5	L	G	N	X							8-63250	RF-SO-03	8/6/92 0940	SK	

Shipment for Case complete? (ON)	Page 2 of 4	Sample used for a spike and/or duplicate <b>MHT 911</b>	Additional Sampler Signatures <i>William J. Fleming</i> <i>Scott Klein</i>	Chain of Custody Seal Number
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## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <i>C.W. Baker</i>	Date / Time <b>8/6/92 1324</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

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Split Samples	<input type="checkbox"/> Accepted (Signature)
	<input type="checkbox"/> Declined

1 016600





United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
PO Box 818 Alexandria, VA 22313  
703-557-2490 FTS 557-2490

# Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

Lab No.  
(if applicable)

Case No.

18565

1. Project Code <b>T089204015</b>		Account Code <b>EUT00395BA</b>		2. Region No. <b>VIII</b>		Sampling Co. <b>E+E, INC</b>		4. Date Shipped <b>8/6/92</b>		Carrier <b>FED EX</b>		6. Preservative (Enter in Column D) 1. HCl 2. HNO3 3. NaOH 4. H2SO4 5. K2CR2O7 6. Ice only 7. Other (SAS) (Specify) N. Not preserved		7. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)									
Regional Information <b>DENVER, CO</b>				Sampler (Name) <b>CHARLES W. BAKER</b>				Airbill Number <b>4188577315</b> <b>419-238-5691</b>															
Non-Superfund Program				Sampler Signature <i>Charles W. Baker</i>				5. Ship To <b>H2M, INC</b> <b>575 Broad Hollow Rd.</b> <b>Melville, NY 11747</b> <b>(516) 694 3040</b> <b>ATTN: SAMPLE CUSTODIAN</b>															
Site Name <b>RICHARDSON FLAT</b>				4. Type of Activity Remedial SF <input checked="" type="checkbox"/> Lead PA <input type="checkbox"/> Pre-Remedial SS <input type="checkbox"/> RIFS LS <input checked="" type="checkbox"/> RD RA <input type="checkbox"/> CLEM O&M <input type="checkbox"/> REMA NPLD <input type="checkbox"/> REM UST <input type="checkbox"/> OIL UST <input type="checkbox"/>																			
City, State <b>PARK CITY, UT</b>				Site Spill ID																			
CLP Sample Numbers (from labels)		A Enter # from Box 7		B Conc. Low Med High		C Sample Type: Comp./Grab		D Preservative from Box 6		E - RAS Analysis Metals Total Dissolved Cyanide Nitrate/Nitrite Fluoride pH Conductivity		F Regional Specific Tracking Number or Tag Numbers		G Station Location Number		H Mo/Day/Year/Time Sample Collection		I Sampler Initials		J Corresp. CLP Org. Samp. No.		K Designated Field QC	
MHT 911		1		L G		2		X				8-20149		RF-SW-01		8/5/92 1043		CWB		HJ 688			
MHT 911		1		L G		2		X				8-63238		RF-SW-01		8/5/92 1043		CWB		HJ 688			
MHT 912		1		L G		2		X				8-63036		RF-SW-02		8/5/92 1045		CWB		HJ 689			
MHT 913		1		L G		2		X				8-63040		RF-SW-03		8/5/92 0924		CWB		HJ 695			
MHT 914		1		L G		2		X				8-63044		RF-SW-04		8/5/92 0910		CWB		HK 250			
MHT 915		1		L G		2		X				8-63048		RF-SW-05		8/5/92 0844		CWB		HK 251			
MHT 916		1		L G		2		X				8-63223		RF-SW-06		8/5/92 0825		CWB		HK 252			
MHT 917		1		L G		2		X				8-63224		RF-SW-07		8/5/92 0942		CWB					
MHT 918		1		L G		2						8-63225		RF-SW-08		8/5/92 1130		CWB					
MHT 919		1		L G		2						8-63226		RF-SW-09								CWB	
Shipment for Case complete? <input checked="" type="checkbox"/> (N)				Page 4 of 4				Sample used for a spike and/or duplicate <b>MHT 911</b>				Additional Sampler Signatures <i>William J. Fleming</i>				Chain of Custody Seal Number							

## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <i>C.W. Baker</i>	Date / Time <b>8/6/92 1324</b>	Received by: (Signature) <b>FED EX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

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United States Environmental Protection Agency  
Contract Laboratory Program Sample Management Office  
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703-557-2490 FTS 557-2490

# Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No.  
(if applicable)

Case No.

18565

1. Project Code <b>TD89204015</b>	Account Code <b>EUT00395BA</b>	2. Region No. <b>VIII</b>	Sampling Co. <b>E+E, INC</b>	4. Date Shipped <b>8/6/92</b>	Carrier <b>FED EX</b>	6. Preservative (Enter in Column D) 1. HCl 2. HNO3 3. NaOH 4. H2SO4 5. K2CR2O7 6. Ice only 7. Other (SAS) (Specify) N. Not preserved	7. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>CHARLES W. BAKER</b>		Airbill Number <b>4188577315</b> <b>419238-56915K</b>			
Non-Superfund Program <b>-</b>		Sampler Signature <i>Charles W. Baker</i>		5. Ship To <b>H&amp;M, Inc.</b> <b>575 Broad Hollow Rd.</b> <b>Melville, NY 11792</b> <b>(516) 694 3040</b> <b>ATTN: SAMPLE CUSTODIAN</b>			
Site Name <b>RICHMOND FLAT</b>		4. Type of Activity Remedial Lead <input type="checkbox"/> Pre-Remedial <input type="checkbox"/> SF <input type="checkbox"/> PA <input type="checkbox"/> RA <input type="checkbox"/> RIFS <input type="checkbox"/> RD <input type="checkbox"/> CLEM <input type="checkbox"/> ST <input type="checkbox"/> SSI <input type="checkbox"/> O&M <input type="checkbox"/> REMA <input type="checkbox"/> REM <input type="checkbox"/> FED <input type="checkbox"/> LSI <input checked="" type="checkbox"/> NPLD <input type="checkbox"/> OIL <input type="checkbox"/> UST <input type="checkbox"/>					

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis						F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
					Total	Dissolved	Cyanide	Nitrate/ Nitrite	Fluoride	pH	Conductivity					
MHT 920	1	L	G	2								8-63227	RF-SE-10			WRE
MHT 921	5	L	G	N	X							8-63228	RF-SE-01	8/5/92 1407	WRE	
MHT 925	5	L	G	N	X							8-63239	RF-SE-01D	8/5/92 1407	WRE	
MHT 922	5	L	G	N	X							8-63229	RF-SE-02	8/5/92 1418	WRE	
MHT 923	5	L	G	N	X							8-63230	RF-SE-03	8/5/92 1442	WRE	
MHT 924	5	L	G	N	X							8-63231	RF-SE-04	8/5/92 1452	WRE	

Shipment for Case complete? (Y/N) <b>(Y)</b>	Page <b>3</b> of <b>4</b>	Sample used for a spike and/or duplicate <b>MHT 911</b>	Additional Sampler Signatures <i>William J. Fleming</i>	Chain of Custody Seal Number
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## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <i>C.W. Baker</i>	Date / Time <b>8/6/92 1324</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

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703-557-2490 FTS 557-2490

# Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SMO No.  
(if applicable)

Case No.

18565

1. Project Code <b>7089204015</b>	Account Code <b>EUT 04 SPBA</b>	2. Region No. <b>VIII</b>	Sampling Co. <b>E&amp;E-INC</b>	4. Date Shipped <b>8/6/92</b>	Carrier <b>FEDEX</b>	6. Preservative (Enter in Column D) 1. HCl 2. HNO3 3. NaOH 4. H2SO4 5. K2CR2O7 6. Ice only 7. Other (SAS) (Specify) N. Not preserved	7. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)				
Regional Information <b>DENVER, CO</b>		Sampler (Name) <b>SCOTT KEEN</b>		Airbill Number <b>4188577315</b> <b>4192385691 SK</b>							
Non-Superfund Program		Sampler Signature <i>Scott Keen</i>		5. Ship To <b>H2M INC</b> <b>575 BROAD HOLLOW ROAD</b> <b>MELVILLE, NY 11747</b> <b>(516) 694-3440</b> <b>ATTN: SAMPLE CUSTODIAN</b>							
Site Name <b>RICHARDSON FLATS</b>		4. Type of Activity Lead <input checked="" type="checkbox"/> Pre-Remedial <input type="checkbox"/> Remedial <input type="checkbox"/> Removal <input type="checkbox"/> SF <input type="checkbox"/> PRP <input type="checkbox"/> ST <input type="checkbox"/> FED <input type="checkbox"/> PA <input type="checkbox"/> SSI <input type="checkbox"/> LSI <input checked="" type="checkbox"/> RIFS <input type="checkbox"/> RD <input type="checkbox"/> RA <input type="checkbox"/> O&M <input type="checkbox"/> NPLD <input type="checkbox"/> CLM <input type="checkbox"/> REMA <input type="checkbox"/> REM <input type="checkbox"/> OIL <input type="checkbox"/> UST <input type="checkbox"/>									
City, State <b>PARK CITY, UT</b>		Site Spill ID									
CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis Metals: Total, Dissolved, Cyanide Low Conc.: Nitrate, Nitrite, Fluoride High: pH, Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
MHT930	5	L	G	N	X		8-62118	RF-50-04	8/6/92 1012	SK	
MHT931	5	L	G	N	X		8-62117	RF-50-05	8/6/92 1425	SK	
MHT932	5	L	G	N	X		8-62116	RF-50-06	8/6/92 1040	SK	
Shipment for Case complete? <input checked="" type="checkbox"/> (N)											
Page 1 of <b>4</b>		Sample used for a spike and/or duplicate <b>MHT 911</b>				Additional Sampler Signatures		Chain of Custody Seal Number			

## CHAIN OF CUSTODY RECORD

Relinquished by: (Signature) <b>C.W. BL</b>	Date / Time <b>8/6/92 1324</b>	Received by: (Signature) <b>FEDEX</b>	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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APPENDIX C  
UTAH, STANDARDS OF QUALITY FOR WATERS OF THE STATE

STATE OF UTAH  
DEPARTMENT OF HEALTH  
DIVISION OF ENVIRONMENTAL HEALTH

WASTEWATER DISPOSAL REGULATIONS

PART II

STANDARDS OF QUALITY FOR WATERS OF THE STATE

Adopted By  
Utah Water Pollution Control Board May 18, 1965  
Utah State Board of Health May 19, 1965

Revised by Action of the Utah Water Pollution Control Committee  
April 21, 1988

Under Authority of  
26-11-1 through 20  
Utah Code Annotated 1953, as Amended

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## **R448-2 Standards of Quality for Waters of the State**

### **R448-2-0 Public Policy**

Whereas the pollution of the waters of this state constitute a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and whereas such pollution is contrary to the best interests of the state and its policy for the conservation of the water resources of the state, it is hereby declared to be the public policy of this state to conserve the waters of the state and to protect, maintain and improve the quality thereof for public water supplies, for the propagation of wildlife, fish and aquatic life, and for domestic, agricultural, industrial, recreational and other legitimate beneficial uses; to provide that no waste be discharged into any waters of the state without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution; to place first in priority those control measures directed toward elimination of pollution which creates hazards to the public health; to insure due consideration of financial problems imposed on water polluters through pursuit of these objectives; and to cooperate with other agencies of the state, agencies of other states and the federal government in carrying out these objectives.

### **R448-2-1 Authority**

These standards are promulgated pursuant to 26-11-1 through 26-11-20 Utah Code Annotated 1953, as amended.

### **R448-2-2 Scope**

These standards shall apply to all waters of the state and shall be assigned to specific waters through the classification procedures prescribed by 26-11-6(5) Utah Code Annotated 1953, as amended. (See also Section 2.6 of these regulations).

### **R448-2-3 Antidegradation Policy**

#### **3.1 Maintenance of Water Quality**

Waters whose existing quality is better than the established standards for the designated uses will be maintained at high quality unless it is determined by the Committee, after appropriate intergovernmental coordination and public participation in concert with the Utah continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. However, existing instream water uses shall be maintained and protected. No water quality degradation is allowable which would interfere with or become injurious to existing instream water uses.

In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Federal Clean Water Act.



### 3.2 Antidegradation Segments

Waters of high quality which have been determined by the Committee to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection, shall be maintained at existing high quality through designation, by the Committee after public hearing, as antidegradation segments. New point source discharges of wastewater, treated or otherwise, are prohibited in such segments after the effective date of designation. Protection of such segments from pathogens in diffuse, underground sources is covered in R448-5 and R448-7 and the Regulations for Individual Wastewater Disposal Systems (R449-201). Other diffuse sources (nonpoint sources) of wastes shall be controlled to the extent feasible through implementation of best management practices or regulatory programs.

Projects such as, but not limited to, construction of dams or roads will be considered in antidegradation segments on a case-by-case basis where pollution will result only during the actual construction activity, and where best management practices will be employed to minimize pollution effects.

Waters of the state designated as antidegradation segments are listed in Section 2.12.

#### R448-2-4 Colorado River Salinity Standards

In addition to quality protection afforded by these regulations to waters of the Colorado River and its tributaries, such waters shall be protected also by requirements of "Proposed Water Quality Standards for Salinity including Numeric Criteria and Plan of Implementation for Salinity Control, Colorado River System, June 1975" and a supplement dated August 26, 1975, entitled "Supplement, including Modifications to Proposed Water Quality Standards for Salinity including Numeric Criteria and Plan of Implementation for Salinity Control, Colorado River System, June 1975", as approved by the seven Colorado River Basin States and the U.S. Environmental Protection Agency, as updated by the 1978 Revision and the 1981 1984, and 1987 Reviews of the above documents.

#### R448-2-5 Mixing Zones

A mixing zone is a limited portion of a body of water, contiguous to a discharge, where dilution is in progress but has not yet resulted in concentrations which will meet certain standards for all pollutants. At no time, however, shall concentrations within the mixing zone be allowed which are acutely lethal as determined by bioassay or other approved procedure. Mixing zones may be delineated for the purpose of guiding sample collection procedures. The zone shall be small in extent and must not form a barrier to migrating aquatic life. Domestic wastewater effluents discharged to mixing zones shall meet effluent requirements specified in R448-1-3.

#### R448-2-6 Use Designations

The Committee as required by 26-11-6 Utah Code Annotated 1953, as amended, shall group the waters of the state into classes so as to protect against controllable pollution the beneficial uses designated within each class as set forth below. Surface waters of the state are hereby classified as shown in Section 2.13.

6.1 Class 1 -- protected for use as a raw water source for domestic water systems.

a. Class 1A -- Reserved.

b. Class 1B -- Reserved.

c. Class 1C -- protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health.

6.2 Class 2 -- protected for in-stream recreational use and aesthetics.

a. Class 2A -- protected for recreational bathing (swimming).

b. Class 2B -- protected for boating, water skiing, and similar uses, excluding recreational bathing (swimming).

6.3 Class 3 -- protected for in-stream use by aquatic wildlife.

a. Class 3A -- protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.

b. Class 3B -- protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.

c. Class 3C -- protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.

d. Class 3D -- protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.

6.4 Class 4 -- protected for agricultural uses including irrigation of crops and stockwatering.

6.5 Class 5 -- Reserved.

6.6 Class 6 -- waters requiring protection when conventional uses as identified in Sections 2.6.1 through 2.6.5 do not apply. Standards for this class are determined on a case-by-case basis.

#### R448-2-7 Water Quality Standards

##### 7.1 Application of Standards

The numeric criteria listed in Section 2.14 shall apply to each of the classes assigned to waters of the State as specified in Section 2.6 of these regulations. It shall be unlawful and a violation of these regulations for any person to discharge or place any wastes or other substances in such manner as may interfere with designated uses protected by assigned classes or to cause any of the applicable standards to be violated, except as provided in R448-1-3.1. The Committee may allow, on a case-by-case basis, site specific modifications based upon bioassay or other tests performed in accordance with standard procedures determined by the Committee.

## **7.2 Narrative Standards**

It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, as determined by bioassay or other tests performed in accordance with standard procedures determined by the Committee.

### **R448-2-8 Protection of Downstream Uses**

All actions to control waste discharges under these regulations shall be modified as necessary to protect downstream designated uses.

### **R448-2-9 Intermittent Waters**

Failure of a stream to meet water quality standards when stream flow is either unusually high or less than the 7-day, 10-year minimum flow shall not be cause for action against persons discharging wastes which meet both the requirements of R448-1 and the requirements of applicable permits.

### **R448-2-10 Laboratory and Field Analyses**

#### **10.1 Laboratory Analyses**

All laboratory examinations of samples collected to determine compliance with these regulations shall be performed in accordance with standard procedures by the Utah Office of State Health Laboratory or by a laboratory certified by the Utah Department of Health.

#### **10.2 Field Analyses**

All field analyses to determine compliance with these regulations shall be conducted in accordance with standard procedures specified by the Utah Department of Health.

### **R448-2-11 Public Participation**

Public hearings will be held to review all proposed revisions of water quality standards, designations and classifications, and public meetings will be held for case-by-case consideration of discharge requirements set to protect water uses under assigned classifications.

**R448-2-12 Antidegradation Segments**

In addition to assigned use classes, the following surface waters of the State are hereby designated as antidegradation segments:

**12.1 Colorado River Drainage**

Calf Creek and tributaries, from confluence with Escalante River to headwaters.

Sand Creek and tributaries, from confluence with Escalante River to headwaters.

Mamie Creek and tributaries, from confluence with Escalante River to headwaters.

Deer Creek and tributaries, from confluence with Boulder Creek to headwaters (Garfield County).

Indian Creek and tributaries, through Newspaper Rock State Park to headwaters.

**12.2 Green River Drainage**

Fish Creek from confluence with White River to Scofield Dam.

Range Creek and tributaries, from confluence with Green River to headwaters.

Strawberry River and tributaries, from confluence with Red Creek to headwaters.

Avintaquin Creek, from confluence with Strawberry River to confluence with Cottonwood Creek.

Ashley Creek and tributaries, from Steinaker diversion to headwaters.

Jones Hole Creek and tributaries, from confluence with Green River to headwaters.

Green River, from state line to Flaming Gorge Dam.

Tollivers Creek, from confluence with Green River to headwaters.

Allen Creek, from confluence with Green River to headwaters.

**12.3 Virgin River Drainage**

North Fork Virgin River and tributaries, from confluence with East Fork Virgin River to headwaters.

East Fork Virgin River and tributaries from confluence with North Fork Virgin River to headwaters.

**12.4 Kanab Creek Drainage**

Kanab Creek and tributaries, from irrigation diversion at confluence with Reservoir Canyon to headwaters.

**12.5 Bear River Drainage**

Box Elder Creek, from Brigham City Reservoir to headwaters.

Logan River and tributaries, from lower U.S. National Forest boundary near Mouth of Logan Canyon to headwaters.

Blacksmith Fork and tributaries, from lower U.S. National Forest boundary near mouth of Blacksmith Fork Canyon to headwaters (Cache County).

Swan Creek and tributaries, from Bear Lake to headwaters.

North Eden Creek, from Upper North Eden Reservoir to headwaters.

Big Creek and tributaries, from Big Ditch diversion to headwaters.

Woodruff Creek and tributaries, from Woodruff diversion to headwaters.

#### 12.6 Weber River Drainage

Burch Creek and tributaries, from Harrison Boulevard in Ogden to headwaters.

Ogden River and tributaries, from U.S. National Forest boundary at mouth of Ogden Canyon to headwaters.

Spring Creek and tributaries, from U.S. National Forest boundary to headwaters (Weber County).

Hardscrabble Creek and tributaries, from confluence with East Canyon Creek to headwaters.

Chalk Creek and tributaries, from U.S. Highway 189 to headwaters.

Weber River and tributaries, from U.S. Highway 189 to headwaters.

#### 12.7 Jordan River Drainage

City Creek and tributaries, from City Creek Water Treatment Plant to headwaters (Salt Lake County).

Emigration Creek and tributaries, from Hogle Zoo to headwaters (Salt Lake County).

Red Butte Creek and tributaries, from Foothill Boulevard in Salt Lake City to headwaters.

Parley's Creek and tributaries, from 13th East in Salt Lake City to headwaters.

Mill Creek and tributaries, from Wasatch Boulevard in Salt Lake City to headwaters.

Big Cottonwood Creek and tributaries, from Wasatch Boulevard in Salt Lake City to headwaters.

Little Cottonwood Creek and tributaries, from Metropolitan Water Treatment Plant lower diversion to headwaters (Salt Lake County).

Little Willow Creek and tributaries, from diversion to headwaters (Salt Lake County).

Bell Canyon Creek and tributaries, from Lower Bells Canyon Reservoir to headwaters (Salt Lake County).

South Fork of Dry Creek and tributaries, from Draper Irrigation Company diversion to headwaters (Salt Lake County).

#### 12.8 Provo River Drainage

Upper Falls drainage above Provo City diversion (Utah County).

Bridal Veil Falls drainage above Provo City diversion (Utah County).

Lost Creek and tributaries, above Provo City diversion (Utah County).

#### 12.9 Sevier River Drainage

Chicken Creek and tributaries, from diversion at canyon mouth to headwaters.

Pigeon Creek and tributaries, from diversion to headwaters.

East Fork of Sevier River and tributaries, from Kingston diversion to headwaters.

Parowan Creek and tributaries, from Parowan City to headwaters.

Summit Creek and tributaries, from Summit City to headwaters.

Braffits Creek and tributaries, from canyon mouth to headwaters.

Right Hand Creek and tributaries, from confluence with Coal Creek to headwaters.

#### 12.10 Raft River Drainage

Clear Creek and tributaries, from state line to headwaters (Box Elder County).

Birch Creek (Box Elder County), from state line to headwaters.

Cotton Thomas Creek from confluence with South Junction Creek to headwaters.

#### 12.11 Western Great Salt Lake Drainage

All streams on the South slope of the Raft River Mountains above 7000' mean sea level.

Donner Creek (Box Elder County), from irrigation diversion to Utah-Nevada state line.

Bettridge Creek (Box Elder County), from irrigation diversion to Utah-Nevada state line.

Clover Creek, from diversion to headwaters.

All surface waters on Public land on the Deep Creek Mountains.

#### 12.12 Farmington Bay Drainage

Holmes Creek and tributaries, from Highway US-89 to headwaters (Davis County).

Shepard Creek and tributaries, from Height Bench diversion to headwaters (Davis County).

Farmington Creek and tributaries, from Height Bench Canal diversion to headwaters (Davis County).

Steed Creek and tributaries, from Highway US-89 to headwaters (Davis County).

Stone Creek and tributaries, from U.S. National Forest boundary to headwaters (Davis County).

#### 12.13 Statewide

All surface waters geographically located within the outer boundaries of U.S. National Forests whether on public or private lands.

R448-2-13 Classification of Waters of the State

UPPER COLORADO RIVER BASIN

COLORADO RIVER DRAINAGE

Paria River and tributaries, from state line to headwaters	2B	3C	4
All tributaries to Lake Powell, except as listed separately	2B	3B	4
Escalante River and Tributaries, from Lake Powell to confluence with Boulder Creek	2B	3C	
Escalante River and tributaries, from confluence with Boulder Creek, including Boulder Creek, to headwaters	2B 3A		4
Deer Creek and tributaries, from confluence with Boulder Creek to headwaters	2B 3A		4
Dirty Devil River and tributaries, from Lake Powell to Fremont River		3C	
Fremont River and tributaries, from confluence with Muddy Creek to Capitol Reef National Park		3C	4
Fremont River and tributaries, through Capitol Reef National Park to headwaters	1C	3A	4
Pleasant Creek and tributaries, from confluence with Fremont River to East boundary of Capitol Reef National Park			3C
Pleasant Creek and tributaries, from East boundary of Capitol Reef National Park to headwaters	1C	3A	
Muddy Creek and tributaries, from confluence with Fremont River to Highway U-10 crossing	2B	3C	4
Muddy Creek and tributaries, from Highway U-10 crossing to headwaters	2B 3A		4
Quitchupah Creek and tributaries, from Highway U-10 crossing to headwaters		3A	4
Ivie Creek and tributaries, from Highway U-10 to headwaters		3A	4

San Juan River and tributaries, from Lake Powell to state line except as listed below:	1C	2B	3B	4
Johnson Creek and tributaries, from confluence with Recapture Creek to headwaters	1C	2B	3A	4
Verdure Creek and tributaries, from Highway US-191 crossing to headwaters			3A	4
North Creek and tributaries, from confluence with Montezuma Creek to headwaters	1C		3A	4
South Creek and tributaries, from confluence with Montezuma Creek to headwaters	1C		3A	4
Spring Creek and tributaries, from confluence with Vega Creek to headwaters			3A	4
Montezuma Creek and tributaries, from U.S. Highway 191 to headwaters	1C		3A	4
Colorado River and tributaries, from Lake Powell to state line except as listed separately	1C	2B	3B	4
Indian Creek and tributaries, from confluence with Colorado River to Newspaper Rock State Park			3B	4
Indian Creek and tributaries, through Newspaper Rock State Park to headwaters			3A	4
Kane Canyon Creek and tributaries, from confluence with Colorado River to headwaters			3C	4
Mill Creek and tributaries, from confluence with Colorado River to headwaters		2B	3A	4
Dolores River and tributaries, from confluence with Colorado River to state line		2B	3C	4
Roc Creek and tributaries, from confluence with Dolores River to headwaters			3A	4
LaSal Creek and tributaries, from state line to headwaters			3A	4
Lion Canyon Creek and tributaries, from state line to headwaters			3A	4
Little Dolores River and tributaries, from confluence with Colorado River to state line		2B	3C	4
Bitter Creek and tributaries, from confluence with Colorado River to headwaters			3C	4



GREEN RIVER DRAINAGE

Green River and tributaries, from confluence with Colorado River to state line except as listed below:	1C	2B	3B	4
Thompson Creek and tributaries from Interstate Highway 70 to headwaters			3C	4
San Rafael River and tributaries, from confluence with Green River to confluence with Ferron Creek		2B	3C	4
Ferron Creek and tributaries, from confluence with San Rafael River to Millsite Reservoir			3C	4
Ferron Creek and tributaries, from Millsite Reservoir to headwaters	1C	3A		4
Huntington Creek and tributaries, from confluence with Cottonwood Creek to Highway U-10 crossing			3C	4
Huntington Creek and tributaries, from Highway U-10 crossing to headwaters	1C	3A		4
Cottonwood Creek and tributaries, from confluence with Huntington Creek to Highway U-57 crossing			3C	4
Cottonwood Creek and tributaries, from Highway U-57 crossing to headwaters	1C	3A		4
Cottonwood Canal, Emery County	1C			4
Price River and tributaries, from confluence with Green River to Castle Gate below Price City Water Treatment Plant intake			3C	4
Price River and tributaries, from Castle Gate below Price City Water Treatment Plant intake to headwaters	1C	3A		4
Grassy Trail Creek and tributaries, from Grassy Trail Creek Reservoir to headwaters	1C	3A		4
Range Creek and tributaries, from confluence with Green River to Range Creek Pumping Station		3A		4

Range Creek and tributaries, from Range Creek Pumping Station to headwaters	1C	3A	4
Rock Creek and tributaries, from confluence with Green River to headwaters		2B 3A	4
Nine Mile Creek and tributaries, from confluence with Green River to headwaters		3A	4
Pariette Draw and tributaries, from confluence with Green River to headwaters		3B	3D 4
Willow Creek and tributaries (Uintah County), from confluence with Green River to headwaters		3C	4
White River and tributaries, from confluence with Green River to state line		3C	4
Duchesne River and tributaries, from confluence with Green River to Myton Water Treatment Plant intake		3B	4
Duchesne River and tributaries, from Myton Water Treatment Plant intake to headwaters	1C	3A	4
Uinta River and tributaries, from confluence with Duchesne River to Highway US-40 crossing		3B	4
Uinta River and tributaries, from Highway US-40 crossing to headwaters		3A	4
Power House Canal from confluence with Uinta River to headwaters		3A	4
Lake Fork River and tributaries, from confluence with Duchesne River to headwaters	1C	3A	4
Lake Fork Canal from Dry Gulch Canal diversion to Moon Lake	1C		4
Dry Gulch Canal, from Myton Water Treatment Plant to Lake Fork Canal	1C		4
Whiterocks River and Canal, from Tridell Water Treatment Plant to headwaters	1C	3A	4
Ashley Creek and tributaries, from confluence with Green River to Steinaker diversion		3B	4

Ashley Creek and tributaries, from Steinkaker diversion to headwaters	1C	3A	4
Big Brush Creek and tributaries, from confluence with Green River to Tyzack (Red Fleet) Dam		3B	4
Big Brush Creek and tributaries, from Tyzack (Red Fleet) Dam to headwaters	1C	3A	4
Jones Hole Creek and tributaries, from confluence with Green River to headwaters		3A	
Diamond Gulch Creek and tributaries, from confluence with Green River to headwaters		3A	4
Pot Creek and tributaries, from Crouse Reservoir to headwaters		3A	4
Green River and tributaries, from state line to Flaming Gorge Dam except as listed below:		2B 3A	4
Crouse Creek and tributaries, from confluence with Green River to headwaters		3A	4
Willow Creek and tributaries, from confluence with Green River (Daggett County) to headwaters		3A	4
Sears Creek and tributaries, Daggett County		3A	
Tolivers Creek and tributaries, Daggett County		3A	
Red Creek and tributaries, from confluence with Green River to state line		3C	4
Jackson Creek and tributaries, Daggett County		3A	
Davenport Creek and tributaries, Daggett County		3A	
Goslin Creek and tributaries, Daggett County		3A	
Gorge Creek and tributaries, Daggett County		3A	
Beaver Creek and tributaries, Daggett County		3A	

O-Wi-Yu-Kuts Creek and tributaries, County	3A	
Cart Creek and tributaries, from Flaming Gorge Reservoir to headwaters	3A	
Eagle Creek and tributaries, from Flaming Gorge Reservoir to headwaters	3A	
Carter Creek and tributaries, from Flaming Gorge Reservoir to headwaters	3A	
Sheep Creek and tributaries, from Flaming Gorge Reservoir to headwaters	3A	4
Birch Spring Draw and tributaries, from Flaming Gorge Reservoir to headwaters		3C 4
Spring Creek and tributaries, from Flaming Gorge Reservoir to headwaters	3A	
Birch Creek and tributaries, from state line to headwaters	3A	4
Burnt Fork and tributaries, from state line to headwaters	3A	4
Middle Fork Beaver Creek and tributaries, from state line to headwaters	3A	4
West Fork Beaver Creek and tributaries, from state line to headwaters	3A	4
Henry's Fork and tributaries, from state line to headwaters	3A	4
East Smith's Fork and tributaries, from state line to headwaters	3A	
Van Tassel Creek from Utah-Wyoming state line to headwaters	3A	4
West Muddy Creek and tributaries, from Utah- Wyoming state line to headwaters	3A	4
Gilbert Creek and tributaries, from state line to headwaters	3A	
West Smith's Fork Creek and tributaries from state line to headwaters	3A	
Archie Creek and tributaries, from state line to headwaters	3A	

Willow Creek and tributaries, from state line to headwaters (Summit County)		3A		
Black's Fork River and tributaries, from Meeks Cabin Reservoir to headwaters		3A		
Little West Fork Black's Fork and tributaries from state line to headwaters		3A		
LOWER COLORADO RIVER BASIN				
VIRGIN RIVER DRAINAGE				
Virgin River and tributaries (except as listed below), from state line to Quail Creek diversion		2B	3B	4
Santa Clara River and tributaries, from Gunlock Reservoir to headwaters	1C	3A		4
Santa Clara River from confluence with Virgin River to Gunlock Reservoir	1C		3C	4
Leed's Creek, from confluence with Quail Creek to headwaters		3A		4
Quail Creek from Quail Creek Reservoir to headwaters	1C	2B 3A		4
Ash Creek and tributaries, from confluence with Virgin River to headwaters		3A		4
Virgin River and tributaries (except as listed below), from the Quail Creek diversion to headwaters	1C		3C	4
North Fork Virgin River and tributaries	1C	2B 3A		4
East Fork Virgin River, from town of Glendale to headwaters		3A		4
Kolob Creek, from confluence with Virgin River to headwaters		2B 3A		4
Beaver Dam Wash and tributaries, from Motoqua to headwaters		2B 3A		4

# KANAB CREEK DRAINAGE

Kanab Creek and tributaries, from state line to irrigation diversion at confluence with Reservoir Canyon	3C	4
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Kanab Creek and tributaries, from irrigation diversion at confluence with Reservoir Canyon to headwaters	3A	4
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Johnson Wash and tributaries, from state line to confluence with Red Wash	3C	4
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Johnson Wash and tributaries, from confluence with Red Wash to headwaters	3A	4
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# BEAR RIVER BASIN

# BEAR RIVER DRAINAGE

Bear River and tributaries, from Great Salt Lake to Utah-Idaho border, except as listed below:	2B	3B	3D	4
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Willard Creek, from Willard Bay Reservoir to headwaters	3A	4
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Perry Canyon Creek from U.S. Forest boundary to headwaters	3A	4
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Box Elder Creek from confluence with Black Slough to Brigham City Reservoir	3C	4
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Box Elder Creek, from Brigham City Reservoir to headwaters	3A	4
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Malad River and tributaries, from confluence with Bear River to state line	3C
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Little Bear River and tributaries, from Cutler Reservoir to headwaters	3A	3D	4
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Logan River and tributaries, from Cutler Reservoir to headwaters	2B	3A	3D	4
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Blacksmith Fork and tributaries, from confluence with Logan River to headwaters	3A	4
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Newton Creek and tributaries, from Cutler Reservoir to Newton Reservoir	3B	4
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Clarkston Creek and tributaries, from Newton Reservoir to headwaters	3B	4
Birch Creek and tributaries, from confluence with Clarkston Creek to headwaters	3A	4
Summit Creek and tributaries, from confluence with Bear River to headwaters	3A	4
Cub River and tributaries, from confluence with Bear River to state line, except as listed below:	3B	4
High Creek and tributaries, from confluence with Cub River to headwaters	3A	4
Swan Springs, tributary to Swan Creek	1C	
All tributaries to Bear Lake from Bear Lake to headwaters	3A	4
Swan Creek and tributaries, from Bear Lake to headwaters	3A	4
Big Creek and tributaries, from Bear Lake to headwaters	2B 3A	4
Bear River and tributaries in Rich County	3A	4
Bear River and tributaries, from Utah-Wyoming state line to headwaters (Summit County)	3A	4
Mill Creek and tributaries, from state line to headwaters (Summit County)	3A	4
WEBER RIVER BASIN		
WEBER RIVER DRAINAGE		
Weber River, from Great Salt Lake to Slaterville diversion	3C 3D	4
Weber River and tributaries, from Slaterville diversion to Stoddard diversion	3A	4
Weber River and tributaries, from Stoddard diversion to headwaters	1C 3A	4
Strong's Canyon Creek and tributaries, from U.S. National Forest boundary to headwaters	1C 3A	4

Burch Creek and tributaries, from Harrison Boulevard in Ogden to headwaters	1C	3A	
Spring Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Ogden River and tributaries, from confluence with Weber River to Pineview Dam		3A	4
Wheeler Creek from confluence with Ogden River to headwaters	1C	3A	4
All tributaries to Pineview Reservoir including those listed below:	1C	3A	4
North Fork of Ogden River and tributaries	1C	3A	4
Middle Fork of Ogden River and tributaries	1C	3A	4
South Fork of Ogden River and tributaries	1C	3A	4

#### UTAH LAKE-JORDAN RIVER BASIN

##### JORDAN RIVER DRAINAGE

Jordan River, from Farmington Bay to North Temple Street, Salt Lake City	2B	3B*	3D 4
Jordan River, from North Temple Street in Salt Lake City to confluence with Little Cottonwood Creek	2B	3B*	4
Surplus Canal from Great Salt Lake to the diversion from the Jordan River		3B*	3D 4
Jordan River from confluence with Little Cottonwood Creek to Narrows Diversion	2B 3A		4
Jordan River, from Narrows Diversion to Utah Lake	1C	2B 3B	4
City Creek, from Memory Park in Salt Lake City to City Creek Water Treatment Plant	2B 3A		
City Creek, from City Creek Water Treatment Plant to headwaters	1C	3A	

\* Site specific criteria for un-ionized ammonia and dissolved oxygen.  
See Table 2.14.5



Parley's Creek and tributaries, from 1300 East in Salt Lake City to Mountain Dell Reservoir		2B	3C	
Parley's Creek and tributaries, from Mountain Dell Reservoir to headwaters	1C	3A		
Emigration Creek and tributaries, from Foothill Boulevard in Salt Lake City to headwaters		3A		
Red Butte Creek and tributaries, from Red Butte Reservoir to headwaters	1C	3A		
Mill Creek (Salt Lake County) from confluence with Jordan River to Interstate Highway 15			3C	4
Mill Creek (Salt Lake County) and tributaries from Interstate Highway 15 to headwaters		3A		4
Big Cottonwood Creek and tributaries, from confluence with Jordan River to Big Cottonwood Water Treatment Plant		2B 3A		4
Big Cottonwood Creek and tributaries, from Big Cottonwood Water Treatment Plant to headwaters	1C	3A		
Deaf Smith Canyon Creek and tributaries	1C	3A		4
Little Cottonwood Creek and tributaries, from confluence with Jordan River to Metropolitan Water Treatment Plant		3A		4
Little Cottonwood Creek and tributaries, from Metropolitan Water Treatment Plant to headwaters	1C	3A		
Bell Canyon Creek and tributaries, from lower Bell's Canyon reservoir to headwaters	1C	3A		
Little Willow Creek and tributaries, from Draper Irrigation Company diversion to headwaters	1C	3A		
Big Willow Creek and tributaries, from Draper Irrigation Company diversion to headwaters	1C	3A		
South Fork of Dry Creek and tributaries, from Draper Irrigation Company diversion to headwaters	1C	3A		

All permanent streams on east slope of Oquirrh Mountains  
(Coon, Barney's, Bingham, Butterfield, and Rose  
Creeks)

3D 4

Kersey Creek/C-7 Ditch system from Great  
Salt Lake to headwaters

6

#### PROVO RIVER DRAINAGE

Provo River and tributaries, from Utah Lake  
to Murdock Diversion

2B 3A

4

Provo River and tributaries, from Murdock  
Diversion to headwaters

1C

2B 3A

4

Upper Falls drainage above Provo City  
diversion

1C

3A

Bridal Veil Falls drainage above Provo  
City diversion

1C

3A

Lost Creek and tributaries above Provo  
City diversion

1C

3A

#### UTAH LAKE DRAINAGE

American Fork Creek and tributaries, from  
diversion at mouth of American Fork Canyon  
to headwaters

3A

4

Spanish Fork River and tributaries, from  
Utah Lake to diversion at Moark Junction

3B

3D 4

Spanish Fork River and tributaries, from  
diversion at Moark Junction to headwaters

3A

4

Spring Creek and tributaries, from Utah  
Lake near Lehi to headwaters

3A

4

Lindon Hollow Creek and tributaries, from  
Utah Lake to headwaters

3B

4

Mill Race (except from Interstate Highway 15 to the Provo City WWTP discharge) and tributaries from Utah Lake to headwaters	3B	4
Mill Race from Interstate Highway 15 to the Provo City wastewater treatment plant discharge	3B*	4
Spring Creek and tributaries from Utah Lake (Provo Bay) to 50 feet upstream from the east boundary of the Industrial Parkway Road Right-of-way	3B	4
Tributary to Spring Creek (Utah County) which receives the Springville City WWTP effluent from confluence with Spring Creek to headwaters		3D 4
Spring Creek and tributaries from 50 feet upstream from the east boundary of the Industrial Parkway Road right-of-way to the headwaters	3A	4
Ironton Canal from Utah Lake (Provo Bay) to the east boundary of the Denver and Rio Grande Western Railroad right-of-way	3C*	4
Ironton Canal from the east boundary of the Denver and Rio Grande Western Railroad right-of-way to the point of diversion from Spring Creek	3A	4
Hobble Creek and tributaries, from Utah Lake to headwaters	3A	4
Dry Creek and tributaries from Utah Lake (Provo Bay) to Interstate Highway 15	3C	4
Dry Creek and tributaries from Interstate Highway 15 to headwaters	3A	4
Benjamin Slough and tributaries (except Beer Creek) from Utah Lake to headwaters	3B	4
Beer Creek (Utah County) from 4850 West (in NE1/4NE1/4 sec. 36, T.8 S., R.1 E.) to headwaters	3C*	4

\* Special case numeric criteria for Total Residual Chlorine.  
See Table 2.14.2, Footnote (7).

All other permanent streams entering Utah Lake	3B	4
Salt Creek, from Nephi diversion to headwaters	3A	4
Currant Creek, from Mona Reservoir to mouth of Goshen Canyon	3A	4
Burrison Creek, from Mona Reservoir to headwaters	3A	4
Peteetneet Creek and tributaries, from irrigation diversion above Maple Dell to headwaters	2B 3A	4
Summit Creek and tributaries (above Santaquin), from U.S. National Forest boundary to headwaters	2B 3A	4
Rock Canyon Creek and tributaries (East of Provo) from U.S. National Forest boundary to headwaters	1C 3A	4
Dry Creek and tributaries (above Alpine), from U.S. National Forest boundary to headwaters	2B 3A	4
SEVIER RIVER BASIN		
SEVIER RIVER DRAINAGE		
Tributaries to Beaver River from confluence with Sevier River to Minersville City from U.S. National Forest boundary to headwaters	3A	4
Tributaries to Sevier River from Sevier Lake to Gunnison Bend Reservoir from U.S. National Forest boundary to headwaters	3A	4
Pioneer Creek and tributaries, Millard County	3A	4
Chalk Creek and tributaries, Millard County	3A	4
Meadow Creek and tributaries, Millard County	3A	4
Corn Creek and tributaries, Millard County	3A	4

Tributaries to Sevier River from Gunnison Bend Reservoir to Annabella Diversion from U.S. National Forest boundary to headwaters	3A	4
Sevier River and tributaries from Gunnison Bend Reservoir to Annabella Diversion except the following tributaries:	3B	4
Oak Creek and tributaries, Millard County	3A	4
Round Valley Creek and tributaries, Millard County	3A	4
Chicken Creek and tributaries, Juab County	3A	4
San Pitch River and tributaries, from confluence with Sevier River to Highway U-132 crossing except the following tributaries:	3C 3D	4
Twelve Mile Creek and tributaries, from U.S. Forest Service boundary to headwaters	3A	4
Six Mile Creek and tributaries, Sanpete County	3A	4
Manti Creek and tributaries, from U.S. Forest Service boundary to headwaters	3A	4
Ephraim Creek and tributaries, from U.S. Forest Service to headwaters	3A	4
Oak Creek and tributaries, from U.S. Forest Service boundary near Spring City to headwaters	3A	4
Fountain Green Creek and tributaries, from U.S. Forest Service boundary to headwaters	3A	4
San Pitch River and tributaries, from Highway U-132 crossing to headwaters	3A	4
Judd Creek and tributaries, Juab County	3A	4
Meadow Creek and tributaries, Juab County	3A	4
Cherry Creek and tributaries, Juab County	3A	4

Tanner Creek and tributaries, Juab County	3A	4
Baker Hot Springs, Juab County		3D 4
Sevier River and tributaries, from Annabella Diversion to headwaters	3A	4
Monroe Creek and tributaries, from diversion to headwaters	3A	4
Beaver River and tributaries, from Minersville City to headwaters	3A	4
Little Creek and tributaries, from irrigation diversion to headwaters	3A	4
Pinto Creek and tributaries, from Newcastle Reservoir to headwaters	3A	4
Coal Creek and tributaries	3A	4
Summit Creek and tributaries	3A	4
Parowan Creek and tributaries	3A	4
Duck Creek and tributaries	1C 3A	4

#### GREAT SALT LAKE BASIN

##### WESTERN GREAT SALT LAKE DRAINAGE

Grouse Creek and tributaries, Box Elder County	3A	4
Muddy Creek and tributaries, Box Elder County	3A	4
Dove Creek and tributaries, Box Elder County	3A	4
Pine Creek and tributaries, Box Elder County	3A	4
Rock Creek and tributaries, Box Elder County	3A	4
Fisher Creek and tributaries, Box Elder County	3A	4
Dunn Creek and tributaries, Box Elder County	3A	4

Donner Creek and tributaries, from irrigation diversion to Utah-Nevada state line	3A	4
Bettridge Creek and tributaries, from irrigation diversion to Utah-Nevada state line	3A	4
Indian Creek and tributaries, Box Elder County	3A	4
Tenmile Creek and tributaries, Box Elder County	3A	4
Curlew (Daep) Creek, Box Elder County	3A	4
Blue Creek and tributaries, from Great Salt Lake to Blue Creek Reservoir		3D 4
Blue Creek and tributaries, from Blue Creek Reservoir to headwaters	3B	4
All perennial streams on the east slope of the Pilot Mountain Range	1C 3A	4
North Willow Creek and tributaries, Tooele County	3A	4
South Willow Creek and tributaries, Tooele County	3A	4
Hickman Creek and tributaries, Tooele County	3A	4
Barlow Creek and tributaries, Tooele County	3A	4
Clover Creek and tributaries, Tooele County	3A	4
Faust Creek and tributaries, Tooele County	3A	4
Vernon Creek and tributaries, Tooele County	3A	4
Ophir Creek and tributaries, Tooele County	3A	4
Settlement Canyon Creek and tributaries, Tooele County	3A	4
Middle Canyon Creek and tributaries, Tooele County	3A	4
Tank Wash and tributaries, Tooele County	3A	4
Basin Creek and tributaries, Juab and Tooele Counties	3A	4
Thomas Creek and tributaries, Juab County	3A	4

Indian Farm Creek and tributaries, Juab County	3A	4
Cottonwood Creek and tributaries, Juab County	3A	4
Red Cedar Creek and tributaries, Juab County	3A	4
Granite Creek and tributaries, Juab County	3A	4
Trout Creek and tributaries, Juab County	3A	4
Birch Creek and tributaries, Juab County	3A	4
Deep Creek and tributaries, from Rock Spring Creek to headwaters, Juab and Tooele Counties	3A	4
Cold Spring, Juab County	3C 3D	
Cane Spring, Juab County	3C 3D	
Lake Creek, from Garrison (Pruess) Reservoir to Nevada state line	3A	4
Snake Creek and tributaries, Millard County	3B	4
Salt Marsh Spring Complex, Millard County	3A	
Twin Springs, Millard County	3B	
Tule Spring, Millard County	3C 3D	
Coyote Spring Complex, Millard County	3C 3D	
Hamblin Valley Wash and tributaries, from Nevada state line to headwaters (Beaver & Iron Counties)	3D 4	
Indian Creek and tributaries, Beaver County, from Indian Creek Reservoir to headwaters	3A	4
Shoal Creek and tributaries, Iron County	3A	4



# FARMINGTON BAY DRAINAGE

Corbett Creek and tributaries, from Highway to headwaters		3A	4
Kays Creek and tributaries, from Farmington Bay to U.S. National Forest boundary		3B	4
North Fork Kays Creek and tributaries, from U.S. National Forest boundary to headwaters		3A	4
Middle Fork Kays Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
South Fork Kays Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Snow Creek and tributaries		3C	4
Holmes Creek and tributaries, from Farmington Bay to U.S. National Forest Boundary		3B	4
Holmes Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Baer Creek and tributaries, from Farmington Bay to Interstate Highway 15		3C	4
Baer Creek and tributaries, from Interstate Highway 15 to Highway US-89		3B	4
Baer Creek and tributaries, from Highway US-89 to headwaters	1C	3A	4
Shepard Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Farmington Creek and tributaries, from Farmington Bay Waterfowl Management Area to U.S. National Forest boundary		3B	4
Farmington Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Rudd Creek and tributaries, from Davis aqueduct to headwaters		3A	4
Steed Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4

Davis Creek and tributaries, from Highway US-89 to headwaters		3A	4
Lone Pine Creek and tributaries, from Highway US-89 to headwaters		3A	4
Ricks Creek and tributaries, from Highway I-15 to headwaters	1C	3A	4
Barnard Creek and tributaries, from Highway US-89 to headwaters		3A	4
Parrish Creek and tributaries, from Davis Aqueduct to headwaters		3A	4
Deuel Creek and tributaries, from Davis Aqueduct to headwaters		3A	4
Stone Creek and tributaries, from Farmington Bay Waterfowl Management Area to U.S. National Forest boundary		3A	4
Stone Creek and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
Barton Creek and tributaries, from U.S. National Forest boundary to headwaters		3A	4
Mill Creek (Davis County) and tributaries, from confluence with State Canal to U.S. National Forest boundary		3B	4
Mill Creek (Davis County) and tributaries, from U.S. National Forest boundary to headwaters	1C	3A	4
North Canyon Creek and tributaries, from U.S. National Forest boundary to headwaters		3A	4

#### SNAKE RIVER BASIN

#### RAFT RIVER DRAINAGE (Box Elder County)

Raft River and tributaries		3A	4
Clear Creek and tributaries, from Utah-Idaho state line to headwaters		3A	4
Onemile Creek and tributaries, from Utah-Idaho state line to headwaters		3A	4

George Creek and tributaries, from Utah-Idaho state line to headwaters	3A	4
Johnson Creek and tributaries, from Utah-Idaho state line to headwaters	3A	4
Birch Creek and tributaries, from state line to headwaters	3A	4
Pole Creek and tributaries, from state line to headwaters	3A	4
Goose Creek and tributaries	3A	4
Hardesty Creek and tributaries, from state line to headwaters	3A	4
Meadow Creek and tributaries, from state line to headwaters	3A	4
ALL IRRIGATION CANALS AND DITCHES STATEWIDE, EXCEPT AS OTHERWISE DESIGNATED		4
ALL DRAINAGE CANALS AND DITCHES STATEWIDE, EXCEPT AS OTHERWISE DESIGNATED		6

NATIONAL WILDLIFE REFUGES AND STATE WATERFOWL  
MANAGEMENT AREAS

Bear River National Wildlife Refuge, Box Elder County	3B	3D
Brown's Park Waterfowl Management Area, Daggett County	3A	3D
Clear Lake Waterfowl Management Area, Millard County		3C 3D
Desert Lake Waterfowl Management Area, Emery County		3C 3D
Farmington Bay Waterfowl Management Area, Davis and Salt Lake Counties		3C 3D
Fish Springs National Wildlife Refuge, Juab County		3C 3D
Harold Crane Waterfowl Management Area, Box Elder County		3C 3D
Howard Slough Waterfowl Management Area, Weber County		3C 3D

Locomotive Springs Waterfowl Management Area, Box Elder County	3B	3D
Ogden Bay Waterfowl Management Area, Weber County	3C	3D
Ouray National Wildlife Refuge, Uintah County	3B	3D
Powell Slough Waterfowl Management Area, Utah County	3C	3D
Public Shooting Grounds Waterfowl Management Area, Box Elder County	3C	3D
Salt Creek Waterfowl Management Area, Box Elder County	3C	3D
Stewart Lake Waterfowl Management Area, Uintah County	3B	3D
Timpie Springs Waterfowl Management Area, Tooele County	3B	3D

#### LAKES AND RESERVOIRS (20 Acres or Larger)

##### BEAVER COUNTY

Manderfield Reservoir	2B	3A	4
LaBaron Reservoir	2B	3A	4
Middle Kent's Lake	2B	3A	4
Minersville Reservoir	2B	3A	3D 4
Puffer Lake	2B	3A	
Three Creeks Reservoir	2B	3A	4

##### BOX ELDER COUNTY

Cutler Reservoir (including portion in Cache County)	2B	3B	3D 4
Etna Reservoir	3A		4
Lynn Reservoir	3A		4
Mantua Reservoir	2B	3A	4
Willard Bay Reservoir	1C	2B	3B 3D 4

# CACHE COUNTY

Hyrum Reservoir	2B 3A	4
Newton Reservoir	2B 3B	4
Porcupine Reservoir	2B 3A	4
Pelican Pond	2B 3B	4
Tony Grove Lake	2B 3A	4

# CARBON COUNTY

Grassy Trail Creek Reservoir	1C 2B 3A	4
Olsen Pond	2B 3B	4
Scofield Reservoir	1C 2B 3A	4

# DAGGETT COUNTY

Browne Reservoir	2B 3A	4
Daggett Lake	2B 3A	4
Flaming Gorge Reservoir (Utah portion)	1C 2A 2B 3A	4
Sheep Creek Reservoir	2B 3A	4
Spirit Lake	2B 3A	4
Upper Potter Lake	2B 3A	4

# DAVIS COUNTY

Holmes Creek Reservoir	2B 3B	4
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# DUCHESNE COUNTY

Allred Lake	2B 3A	4
Atwine Lake	2B 3A	4
Atwood Lake	2B 3A	4
Betsy Lake	2B 3A	4
Big Sandwash Reservoir	1C 2B 3A	4
Bluebell Lake	2B 3A	4

Brown Duck Reservoir	2B 3A	4
Cedarview Reservoir	2B 3A	4
Chain Lake #1	2B 3A	4
Chepeta Lake	2B 3A	4
Clements Reservoir	2B 3A	4
Cleveland Lake	2B 3A	4
Cliff Lake	2B 3A	4
Continent Lake	2B 3A	4
Crater Lake	2B 3A	4
Crescent Lake	2B 3A	4
Daynes Lake	2B 3A	4
Dean Lake	2B 3A	4
Doll Lake	2B 3A	4
Drift Lake	2B 3A	4
Elbow Lake	2B 3A	4
Farmer's Lake	2B 3A	4
Fern Lake	2B 3A	4
Fish Hatchery Lake	2B 3A	4
Five Point Reservoir	2B 3A	4
Fox Lake Reservoir	2B 3A	4
Governor's Lake	2B 3A	4
Granddaddy Lake	2B 3A	4
Island Lake	1C 2B 3A	4
Jean Lake	2B 3A	4
Jordan Lake	2B 3A	4
Kidney Lake	2B 3A	4
Kidney Lake West	2B 3A	4
Lily Lake	2B 3A	4
Midview Reservoir (Lake Boreham)	2B 3B	4

Milk Reservoir	2B 3A	4
Mirror Lake	2B 3A	4
Mohawk Lake	2B 3A	4
Moon Lake	1C 2B 3A	4
North Star Lake	2B 3A	4
Palisade Lake	2B 3A	4
Pine Island Lake	2B 3A	4
Pinto Lake	2B 3A	4
Pole Creek Lake	2B 3A	4
Potter's Lake	2B 3A	4
Powell Lake	2B 3A	4
Queant Lake	2B 3A	4
Rainbow Lake	2B 3A	4
Red Creek Reservoir	2B 3A	4
Rudolph Lake	2B 3A	4
Scout Lake	2B 3A	4
Spider Lake	2B 3A	4
Spirit Lake	2B 3A	4
Starvation Reservoir	1C 2B 3A	4
Superior Lake	2B 3A	4
Swasey Hole Reservoir	2B 3A	4
Taylor Lake	2B 3A	4
Thompson Lake	2B 3A	4
Timothy Reservoir #1	2B 3A	4
Timothy Reservoir #6	2B 3A	4
Timothy Reservoir #7	2B 3A	4
Twin Pots Reservoir	1C 2B 3A	4
X - 24 Lake	2B 3A	4

EMERY COUNTY

Cleveland Reservoir	2B 3A	4
Electric Lake	3A	4
Huntington Reservoir	2B 3A	4
Huntington North Reservoir	2B 3B	4
Joe's Valley Reservoir	2B 3A	4
Millsite Reservoir	1C 2B 3A	4

GARFIELD COUNTY

Barney Lake	2B 3A	4
Cyclone Lake	2B 3A	4
Deer Lake	2B 3A	4
Jacob's Valley Reservoir	2B 3C 3D	4
Lower Bowns Reservoir	2B 3A	4
North Creek Reservoir	2B 3A	4
Panguitch Lake	2B 3A	4
Pine Lake	2B 3A	4
Oak Creek Reservoir (Upper Bowns)	2B 3A	4
Pleasant Lake	2B 3A	4
Posey Lake	2B 3A	4
Purple Lake	2B 3A	4
Raft Lake	2B 3A	4
Row Lake #3	2B 3A	4
Row Lake #7	2B 3A	4
Spectacle Reservoir	2B 3A	4



Tropic Reservoir	2B 3A	4
West Deer Lake	2B 3A	4
Wide Hollow Reservoir	2B 3A	4

#### IRON COUNTY

Newcastle Reservoir	2B 3A	4
Paragonah Reservoir	2B 3A	4
Yankee Meadow Reservoir	2B 3A	4

#### JUAB COUNTY

Chicken Creek Reservoir	2B	3C 3D	4
Mona Reservoir	2B	3B	4
Sevier Bridge (Yuba) Reservoir	2B	3B	4

#### KANE COUNTY

Navajo Lake	2B 3A	4
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#### MILLARD COUNTY

DMAD Reservoir	2B	3B	4
Fools Creek Reservoir	2B	3C 3D	4
Garrison Reservoir (Pruess Lake)	2B	3B	4
Gunnison Bend Reservoir	2B	3B	4

#### MORGAN COUNTY

East Canyon Reservoir	2B 3A	4
Lost Creek Reservoir	1C 2B 3A	4

PIUTE COUNTY

Lower Boxcreek Reservoir	2B 3A	4
Manning Meadows Reservoir	2B 3A	4
Otter Creek Reservoir	2B 3A	4
Piute Reservoir	2B 3A	4
Upper Boxcreek Reservoir	2B 3A	4

RICH COUNTY

Bear Lake (Utah portion)	2A 2B 3A	4
Birch Creek Reservoir	2B 3A	4
Little Creek Reservoir	2B 3A	4
Woodruff Creek Reservoir	2B 3A	4

SALT LAKE COUNTY

Decker Lake	2B 3B 3D	4
Lake Mary	1C 2B 3A	
Mountain Dell Reservoir	1C	

SAN JUAN COUNTY

Blanding Reservoir #4	1C 2B 3A	4
Dark Canyon Lake	1C 2B 3A	4
Ken's Lake	2B 3A	4
Lake Powell (Utah portion)	1C 2A 2B 3B	4
Lloyd's Lake	1C 2B 3A	4
Recapture Reservoir	2B 3A	4

SANPETE COUNTY

Duck Fork Reservoir		2B 3A	4
Fairview Lakes	1C	2B 3A	4
Ferron Reservoir		2B 3A	4
Gooseberry Reservoir	1C	2B 3A	4
Gunnison Reservoir		2B 3C	4
Island Lake		2B 3A	4
Miller Flat Reservoir		2B 3A	4
Ninemile Reservoir		2B 3A	4
Palisade Reservoir		2B 3A	4
Rolfson Reservoir		2B 3C	4
Twin Lakes		2B 3A	4
Willow Lake		2B 3A	4

SEVIER COUNTY

Annabella Reservoir		2B 3A	4
Big Lake		2B 3A	4
Farnsworth Lake		2B 3A	4
Fish Lake		2B 3A	4
Forsythe Reservoir		2B 3A	4
Johnson Valley Reservoir		2B 3A	4
Koosharem Reservoir		2B 3A	4
Lost Creek Reservoir		2B 3A	4
Redmond Lake		2B 3B	4
Rex Reservoir		2B 3A	4
Salina Reservoir		2B 3A	4
Sheep Valley Reservoir		2B 3A	4

SUMMIT COUNTY

Abes Lake	2B 3A	4
Alexander Lake	2B 3A	4
Amethyst Lake	2B 3A	4
Beaver Lake	2B 3A	4
Big Elk Reservoir	2B 3A	4
Blanchard Lake	2B 3A	4
China Lake	2B 3A	4
Cliff Lake	2B 3A	4
Clyde Lake	2B 3A	4
Coffin Lake	2B 3A	4
Cuberant Lake	2B 3A	4
East Red Castle Lake	2B 3A	4
Echo Reservoir	1C 2B 3A	4
Fish Lake	2B 3A	4
Fish Reservoir	2B 3A	4
Haystack Reservoir #1	2B 3A	4
Henry's Fork Reservoir	2B 3A	4
Hoop Lake	2B 3A	4
Island Lake	2B 3A	4
Island Reservoir	2B 3A	4
Jesson Lake	2B 3A	4
Kamas Lake	2B 3A	4
Lily Lake	2B 3A	4
Lost Reservoir	2B 3A	4
Lower Red Castle Lake	2B 3A	4
Marsh Lake	2B 3A	4

McPheters Lake		2B 3A	4
Meadow Reservoir		2B 3A	4
Meeks Cabin Reservoir		2B 3A	4
Notch Mountain Reservoir		2B 3A	4
Red Castle Lake		2B 3A	4
Rockport Reservoir	1C	2B 3A	4
Ryder Lake		2B 3A	4
Sand Reservoir		2B 3A	4
Scow Lake		2B 3A	4
Smith Moorehouse Reservoir	1C	2B 3A	
Star Lake		2B 3A	4
Stateline Reservoir		2B 3A	4
Tamarack Lake		2B 3A	4
Trial Lake	1C	2B 3A	4
Upper Lyman Lake		2B 3A	4
Upper Red Castle		2B 3A	4
Wall Lake Reservoir		2B 3A	4
Washington Reservoir		2B 3A	4
Whitney Reservoir		2B 3A	4

TOOELE COUNTY

Blue Lake		2B 3A	4
Clear Lake		2B 3A	4
Grantsville Reservoir		2B 3A	4
Horseshoe Lake		2B 3B	4
Kanaka Lake		2B 3B	4
Rush Lake		2B 3B	
Settlement Canyon Reservoir		2B 3A	4
Stansbury Lake		2B 3B	4
Vernon Reservoir		2B 3A	4

UINTAH COUNTY

Ashley Twin Lakes (Ashley Creek)	1C	2B 3A	4
Bottle Hollow Reservoir		2B 3A	4
Brough Reservoir		2B 3A	4
Calder Reservoir		2B 3A	4
Crouse Reservoir		2B 3A	4
East Park Reservoir		2B 3A	4
Fish Lake		2B 3A	4
Goose Lake #2		2B 3A	4
Oaks Park Reservoir		2B 3A	4
Paradise Park Reservoir		2B 3A	4
Pelican Lake		2B 3B	4
Red Fleet Reservoir	1C	2B 3A	4
Steinaker Reservoir	1C	2B 3A	4
Towave Reservoir		2B 3A	4
Weaver Reservoir		2B 3A	4
Whiterocks Lake		2B 3A	4
Workman Lake		2B 3A	4

UTAH COUNTY

Silver Flat Lake Reservoir		2B 3A	4
Utah Lake		2B 3B 3D	4

WASATCH COUNTY

Currant Creek Reservoir	1C	2B 3A	4
Deer Creek Reservoir	1C	2B 3A	4
Strawberry Reservoir	1C	2B 3A	4

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WASHINGTON COUNTY

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Baker Dam Reservoir		2B	3A	4
Gunlock Reservoir	1C	2B	3B	4
Ivins Reservoir		2B	3B	4
Kolob Reservoir		2B	3A	4
Lower Enterprise Reservoir		2B	3A	4
Quail Creek Reservoir	1C	2B	3B	4
Upper Enterprise Reservoir		2B	3A	4

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WAYNE COUNTY

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Blind Lake		2B	3A	4
Donkey Reservoir		2B	3A	4
Fish Creek Reservoir		2B	3A	4
Mill Meadow Reservoir		2B	3A	4
Raft Lake		2B	3A	4

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WEBER COUNTY

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Causey Reservoir		2B	3A	4
Pineview Reservoir	1C	2B	3A	4

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GREAT SALT LAKE - Box Elder, Davis, Salt Lake  
Tooele, and Weber County

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TABLE 2.14.1

NUMERIC CRITERIA FOR DOMESTIC, RECREATION,  
AND AGRICULTURAL USES

Parameter	Domestic	Recreation and		Agriculture
	Source 1C	Aesthetics 2A	2B	4
<b>BACTERIOLOGICAL</b> (30-DAY GEOMETRIC MEAN) (NO.)/100 ML)				
MAX. TOTAL COLIFORMS	5000	1000	5000	
MAX. FECAL COLIFORMS	2000	200	200	
<b>PHYSICAL</b>				
MIN. DISSOLVED OXYGEN(MG/L)(1)	5.5	5.5	5.5	
pH (RANGE)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
TURBIDITY INCREASE (NTU)		10	10	
<b>METALS</b> (ACID SOLUBLE, MAXIMUM MG/L) (2)				
ARSENIC	0.05			0.1
BARIUM	1.0			
CADMIUM	0.01			0.01
CHROMIUM	0.05			0.10
COPPER				0.2
LEAD	0.05			0.1
MERCURY	0.002			
SELENIUM	0.01			0.05
SILVER	0.05			
<b>INORGANICS</b> (MAXIMUM MG/L)				
BORON				0.75
FLUORIDE (3)	1.4-2.4			
NITRATES as N	10			
TOTAL DISSOLVED SOLIDS (4)				1200
<b>RADIOLOGICAL</b> (MAXIMUM pCi/L)				
GROSS ALPHA	15			15
RADIUM 226, 228 (COMBINED)	5			
STRONTIUM 90	8			
TRITIUM	20000			



TABLE 2.14.1, CONTINUED

Parameter	Domestic Source 1C	Recreation and Aesthetics 2A      2B		Agriculture 4
ORGANICS (MAXIMUM UG/L)				
CHLOROPHENOXY HERBICIDES				
2,4-D	100			
2,4,5-TP	10			
ENDRIN	0.2			
HEXACHLOROCYCLOHEXANE (LINDANE)	4			
METHOXYCHLOR	100			
TOXAPHENE	5			
POLLUTION INDICATORS (5)				
GROSS BETA (pCi/L)	50			50
BOD (MG/L)		5	5	5
NITRATE AS N (MG/L)		4	4	
PHOSPHATE AS P (MG/L)		0.05	0.05	

## FOOTNOTES:

- (1) These limits are not applicable to lower water levels in deep impoundments.
- (2) The acid soluble method as used by the State Health Laboratory involves acidification of the sample in the field, no digestion process in the laboratory, filtration, and analysis by atomic absorption spectrophotometry.
- (3) Maximum concentration varies according to the daily maximum mean air temperature.

<u>TEMP (C)</u>	<u>MG/L</u>
12.0	2.4
12.1-14.6	2.2
14.7-17.6	2.0
17.7-21.4	1.8
21.5-26.2	1.6
26.3-32.5	1.4

- (4) Total dissolved solids (TDS) limits may be adjusted on a case-by-case basis.
- (5) Investigations should be conducted to develop more information where these pollution indicator levels are exceeded.

TABLE 2.14.2  
NUMERIC CRITERIA FOR AQUATIC WILDLIFE

Parameter	Aquatic Wildlife			
	3A	3B	3C	3D
<b>PHYSICAL</b>				
TOTAL DISSOLVED GASES	(1)	(1)		
DISSOLVED OXYGEN (MG/L) (2)				
30 DAY AVERAGE	6.5	5.5	5.0	5.0
7 DAY AVERAGE	9.5/5.0	6.0/4.0		
1 DAY AVERAGE	8.0/4.0	5.0/3.0	3.0	3.0
MAX. TEMPERATURE (C)	20	27	27	
MAX. TEMPERATURE CHANGE (C)	2	4	4	
pH (RANGE)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
TURBIDITY INCREASE (NTU)	10	10	15	15
<b>METALS (3)</b>				
(ACID SOLUBLE, UG/L) (4)				
ARSENIC (TRIVALENT)				
4 DAY AVERAGE	190	190	190	190
1 HOUR AVERAGE	360	360	360	360
CADMIUM (5)				
4 DAY AVERAGE	1.1	1.1	1.1	1.1
1 HOUR AVERAGE	3.9	3.9	3.9	3.9
CHROMIUM (HEXAVALENT)				
4 DAY AVERAGE	11	11	11	11
1 HOUR AVERAGE	16	16	16	16
CHROMIUM (TRIVALENT) (5)				
4 DAY AVERAGE	210	210	210	210
1 HOUR AVERAGE	1700	1700	1700	1700
COPPER (5)				
4 DAY AVERAGE	12	12	12	
1 HOUR AVERAGE	18	18	18	18
CYANIDE (FREE)				
4 DAY AVERAGE	5.2	5.2	5.2	
1 HOUR AVERAGE	22	22	22	22
IRON (MAXIMUM)	1000	1000	1000	1000
LEAD (5)				
4 DAY AVERAGE	3.2	3.2	3.2	3.2
1 HOUR AVERAGE	82	82	82	82

TABLE 2.14.2, CONTINUED

Parameter	Aquatic Wildlife			
	3A	3B	3C	3D
METALS (CONTINUED) (ACID SOLUBLE, UG/L)				
MERCURY				
4 DAY AVERAGE	0.012	0.012	0.012	0.012
1 HOUR AVERAGE	2.4	2.4	2.4	2.4
NICKEL (5)				
4 DAY AVERAGE	160	160	160	160
1 HOUR AVERAGE	1400	1400	1400	1400
SELENIUM				
4 DAY AVERAGE	5.0	5.0	5.0	5.0
1 HOUR AVERAGE	20	20	20	20
SILVER				
4 DAY AVERAGE	0.12	0.12	0.12	
1 HOUR AVERAGE (5)	4.1	4.1	4.1	4.1
ZINC (5)				
4 DAY AVERAGE	110	110	110	110
1 HOUR AVERAGE	120	120	120	120
INORGANICS (MG/L) (3)				
AMMONIA AS N (UN-IONIZED) (6)				
4 DAY AVERAGE	(6a)	(6a)		
1 HOUR AVERAGE	(6b)	(6b)	(6b)	(6b)
CHLORINE (TOTAL RESIDUAL) (7)				
4 DAY AVERAGE	0.011	0.011		
1 HOUR AVERAGE	0.019	0.019	0.2	(8)
HYDROGEN SULFIDE (UNDISSOCIATED, MAX. UG/L)				
	2.0	2.0	2.0	2.0
PHENOL (MAXIMUM)				
	0.01	0.01	0.01	0.01
RADIOLOGICAL (MAXIMUM pCi/L)				
GROSS ALPHA (9)				
	15	15	15	15

TABLE 2.14.2, CONTINUED

Parameter	Aquatic Wildlife			
	3A	3B	3C	3D
ORGANICS (UG/L) (3)				
ALDRIN (MAXIMUM)	3.0	3.0	3.0	3.0
CHLORDANE				
4 DAY AVERAGE	0.0043	0.0043	0.0043	0.0043
1 HOUR AVERAGE	2.4	2.4	2.4	2.4
ENDOSULFAN				
4 DAY AVERAGE	0.056	0.056	0.056	0.056
1 HOUR AVERAGE	0.18	0.18	0.18	0.18
ENDRIN				
4 DAY AVERAGE	0.0023	0.0023	0.0023	0.0023
1 HOUR AVERAGE	0.18	0.18	0.18	0.18
GUTHION (MAXIMUM)	0.01	0.01	0.01	0.01
HEPTACHLOR				
4 DAY AVERAGE	0.0038	0.0038	0.0038	0.0038
1 HOUR AVERAGE	0.52	0.52	0.52	0.52
HEXACHLOROCYCLOHEXANE (LINDANE)				
4 DAY AVERAGE	0.08	0.08	0.08	0.08
1 HOUR AVERAGE	2.0	2.0	2.0	2.0
METHOXYCHLOR (MAXIMUM)	0.03	0.03	0.03	0.03
MIREX (MAXIMUM)	0.001	0.001	0.001	0.001
PARATHION (MAXIMUM)	0.04	0.04	0.04	0.04
PCB's				
4 DAY AVERAGE	0.014	0.014	0.014	0.014
1 HOUR AVERAGE	2.0	2.0	2.0	2.0
PENTACHLOROPHENOL (10)				
4 DAY AVERAGE	13	13	13	13
1 HOUR AVERAGE	20	20	20	20
TOXAPHENE				
4 DAY AVERAGE	0.0002	0.0002	0.0002	0.0002
1 HOUR AVERAGE	0.73	0.73	0.73	0.73
POLLUTION INDICATORS (9)				
GROSS BETA (pCi/L)	50	50	50	50
BOD (MG/L)	5	5	5	5
NITRATE AS N (MG/L)	4	4	4	
PHOSPHATE AS P (MG/L) (11)	0.05	0.05		

## FOOTNOTES:

- (1) Not to exceed 110% of saturation
- (2) These limits are not applicable to lower water levels in deep impoundments. First number in column is for when early life stages are present, second number is for when all other life stages present.

TABLE 2.14.2, CONTINUED

- (3) Where criteria are listed as 4-day average and 1-hour average concentrations, these concentrations should not be exceeded more often than once every three years on the average.
- (4) The acid soluble method as used by the State Health Laboratory involves acidification of the sample in the field, no digestion process in the laboratory, filtration, and analysis by atomic absorption spectrophotometry.
- (5) Hardness dependent criteria. 100 mg/l used. See Table 2.14.3 for complete equation.
- (6) Un-ionized ammonia toxicity is dependent upon the temperature and pH of the waterbody. For detailed explanation refer to Federal Register, vol. 50, 30784, July 29, 1985.

The following equations are used to calculate criteria concentrations:

(6a) The 4-Day average concentration of un-ionized ammonia in mg/l as N  
 $(0.80/FT/FPH/RATIO) * 0.822$

(6b) The 1-Hour average concentration of un-ionized ammonia in mg/l as N  
 $(0.52/FT/FPH/2) * 0.822$

Where:

FT is a function of temperature which adjusts the criteria concentration for the ambient temperature.

$$FT = 10^{0.03(20-TCAP)} \quad ; \quad TCAP \leq T \leq 30$$

$$= 10^{0.03(20-T)} \quad ; \quad 0 \leq T < TCAP$$

and FPH is a function of pH which adjusts the criteria concentration for ambient pH.

$$FPH = 1 \quad ; \quad 8.0 \leq pH \leq 9.0$$

$$= (1 + 10^{7.4-pH})/1.25 \quad ; \quad 6.5 \leq pH < 8.0$$

and RATIO is the ratio between acute and chronic criteria and is dependent upon pH.

$$RATIO = 16 \quad ; \quad 7.7 \leq pH \leq 9.0$$

$$= 24 (10^{7.7-pH}/(1 + 10^{7.4-pH})) \quad ; \quad 6.5 \leq pH < 7.7$$

and TCAP is the maximum temperature that the criteria can be applied and is dependent upon the aquatic community present (i.e., warm water or cold water).

For Class 3A only: TCAP = 15C in equation 6a  
 = 20C in equation 6b

For Class 3B: TCAP = 20C in equation 6a

For Classes 3B, 3C, and 3D:

TCAP = 25C in equation 6b

For Tables of values, see following page.

- (7) Special case segments and maximum TRC concentrations as follows:
  - Mill Race from Interstate Highway 15 to the Provo City wastewater treatment plant discharge 0.2 mg/l
  - Ironton Canal (Utah County), from Utah Lake (Provo Bay) to East boundary of Denver and Rio Grande Western Railroad right-of-way 0.05 mg/l
  - Beer Creek (Utah County) from 4850 West (in NE1/4NE1/4 sec. 36, T.8 S., R.1 E.) to headwaters 0.3 mg/l
- (8) Numeric criteria determined on a case-by-case basis.
- (9) Investigations should be conducted to develop more information where these levels are exceeded.
- (10) pH dependent criteria. pH 7.8 used in table. See Table 2.14.4 for equation.
- (11) Phosphate as P (mg/l) limit for lakes and reservoirs shall be 0.025.

TABLE 2.14.2, CONTINUED

1-HOUR AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3A WATERS

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.008	0.011	0.015	0.021	0.030	0.030	0.030
7.00	0.019	0.027	0.038	0.054	0.076	0.076	0.076
7.50	0.037	0.053	0.075	0.105	0.149	0.149	0.149
8.00	0.054	0.076	0.107	0.151	0.214	0.214	0.214
8.50	0.054	0.076	0.107	0.151	0.214	0.214	0.214
9.00	0.054	0.076	0.107	0.151	0.214	0.214	0.214

4-DAY AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3A WATERS

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.001	0.001	0.001	0.002	0.002	0.002	0.002
7.00	0.002	0.002	0.003	0.005	0.005	0.005	0.005
7.50	0.005	0.008	0.011	0.015	0.015	0.015	0.015
8.00	0.010	0.015	0.021	0.029	0.029	0.029	0.029
8.50	0.010	0.015	0.021	0.029	0.029	0.029	0.029
9.00	0.010	0.015	0.021	0.029	0.029	0.029	0.029

1-HOUR AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3B, 3C, AND 3D WATERS

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.008	0.011	0.015	0.021	0.030	0.042	0.042
7.00	0.019	0.027	0.038	0.054	0.076	0.107	0.107
7.50	0.037	0.053	0.075	0.105	0.149	0.210	0.210
8.00	0.054	0.076	0.107	0.151	0.214	0.302	0.302
8.50	0.054	0.076	0.107	0.151	0.214	0.302	0.302
9.00	0.054	0.076	0.107	0.151	0.214	0.302	0.302

4-DAY AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3B WATERS

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.001	0.001	0.001	0.002	0.002	0.002	0.002
7.00	0.002	0.002	0.003	0.005	0.007	0.007	0.007
7.50	0.005	0.008	0.011	0.015	0.022	0.041	0.041
8.00	0.010	0.015	0.021	0.029	0.041	0.041	0.041
8.50	0.010	0.015	0.021	0.029	0.041	0.041	0.041
9.00	0.010	0.015	0.021	0.029	0.041	0.041	0.041

TABLE 2.14.3

EQUATIONS FOR PARAMETERS WITH HARDNESS (1)  
DEPENDENCE

Parameter	4-Day Average Concentration (UG/L)	1-Hour Average Concentration (UG/L)
CADMIUM	$e(0.7852[\ln(\text{hardness})]-3.490)$	$e(1.128[\ln(\text{hardness})]-3.828)$
CHROMIUM (TRIVALENT)	$e(0.8190[\ln(\text{hardness})]+1.561)$	$e(0.8190[\ln(\text{hardness})]+3.688)$
COPPER	$e(0.8545[\ln(\text{hardness})]-1.465)$	$e(0.9422[\ln(\text{hardness})]-1.464)$
LEAD	$e(1.273[\ln(\text{hardness})]-4.705)$	$e(1.273[\ln(\text{hardness})]-1.460)$
NICKEL	$e(0.8460[\ln(\text{hardness})]+1.1645)$	$e(0.8460[\ln(\text{hardness})]+3.3612)$
SILVER	N/A	$e(1.72[\ln(\text{hardness})]-6.52)$
ZINC	$e(0.8473[\ln(\text{hardness})]+0.7614)$	$e(0.8473[\ln(\text{hardness})]+0.8604)$

## FOOTNOTE:

(1) Hardness as mg/l  $\text{CaCO}_3$ .

TABLE 2.14.4

EQUATIONS FOR PENTACHLOROPHENOL  
(pH DEPENDENT)

4-Day Average Concentration (UG/L)	1-Hour Average Concentration (UG/L)
$e[1.005(\text{pH})]-5.290$	$e[1.005(\text{pH})]-4.830$

TABLE 2.14.5

SITE SPECIFIC CRITERIA FOR UN-IONIZED  
AMMONIA AND DISSOLVED OXYGEN FOR JORDAN RIVER  
AND SURPLUS CANAL SEGMENTS (SEE SECTION 2.13)

## Dissolved Oxygen:

## May-July

7-day average	5.5 mg/l
30-day average	5.5 mg/l
Instantaneous minimum	4.5 mg/l

## August-April

30-day average	5.5 mg/l
Instantaneous minimum	4.0 mg/l

## Un-ionized Ammonia as N:

- (1) Maximum concentration should not exceed the numerical value given by the following:

$$0.15 \times \frac{f(T)}{f(pH)} \times 2.989$$

where:

$$\begin{aligned} f(T) &= 1 && ; T \geq 10C \\ &= \frac{1 + 10^{(9.73-pH)}}{1 + 10^{(pK_t - pH)}} && ; T < 10C \end{aligned}$$

$$f(pH) = 1 + 10^{[1.03(7.32-pH)]}$$

$$pK_t = 0.090 + \frac{2730}{(T + 273.2)}$$

- (2) The average concentration over any 30 consecutive days should be less than the value given by the following:

$$0.031 \times \frac{f(T)}{f(pH)} \times 1.774$$

where:

$$\begin{aligned} f(pH) &= 1 && ; pH \geq 7.7 \\ &= 10^{[0.74(7.7-pH)]} && ; pH < 7.7 \\ f(T) &= 1 && ; T \geq 10C \\ &= \frac{1 + 10^{(9.73-pH)}}{1 + 10^{(pK_t - pH)}} && ; T < 10C \end{aligned}$$



Table 2.14.5 (continued)

## MAXIMUM CONCENTRATION UN-IONIZED AMMONIA AS N (MG/L)

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.025	0.038	0.056	0.056	0.056	0.056	0.056
6.75	0.041	0.062	0.092	0.092	0.092	0.092	0.092
7.00	0.064	0.096	0.143	0.143	0.143	0.143	0.143
7.25	0.091	0.138	0.206	0.206	0.206	0.206	0.206
7.50	0.121	0.183	0.271	0.271	0.271	0.271	0.271
7.75	0.147	0.222	0.330	0.330	0.330	0.330	0.330
8.00	0.168	0.253	0.374	0.374	0.374	0.374	0.374
8.25	0.183	0.274	0.404	0.404	0.404	0.404	0.404
8.50	0.194	0.289	0.423	0.423	0.423	0.423	0.423
8.75	0.203	0.301	0.434	0.434	0.434	0.434	0.434
9.00	0.214	0.312	0.440	0.440	0.440	0.440	0.440

## 30-DAY AVERAGE CONCENTRATION UN-IONIZED AMMONIA AS N (MG/L)

pH	TEMPERATURE (C)						
	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.003	0.005	0.007	0.007	0.007	0.007	0.007
6.75	0.005	0.007	0.011	0.011	0.011	0.011	0.011
7.00	0.007	0.011	0.017	0.017	0.017	0.017	0.017
7.25	0.011	0.017	0.026	0.026	0.026	0.026	0.026
7.50	0.017	0.026	0.039	0.039	0.039	0.039	0.039
7.75	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.00	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.25	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.50	0.025	0.038	0.055	0.055	0.055	0.055	0.055
8.75	0.026	0.038	0.055	0.055	0.055	0.055	0.055
9.00	0.027	0.039	0.055	0.055	0.055	0.055	0.055

KEY: Water Pollution, Water Quality Standards\*  
4/21/88

26-11

## ADDENDUM TO PART II

### STANDARDS OF QUALITY FOR WATERS OF THE STATE

The following sections or revisions to sections were adopted by the Utah Water Pollution Control Committee on January 18, 1991 and became effective on January 25, 1991.

#### **R448-2-7. Water Quality Standards.**

##### **7.1 Application of Standards**

The numeric criteria listed in Section 2.14 shall apply to each of the classes assigned to waters of the State as specified in Section 2.6 of these regulations. It shall be unlawful and a violation of these regulations for any person to discharge or place any wastes or other substances in such manner as may interfere with designated uses protected by assigned classes or to cause any of the applicable standards to be violated, except as provided in R448-1-3.1. The Committee may allow, on a case-by-case basis, site specific modifications based upon bioassay or other tests performed in accordance with standard procedures determined by the Committee.

##### **7.2 Narrative Standards**

It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures.

**R448-2-14. Numeric Criteria.**

TABLE 2.14.1  
NUMERIC CRITERIA FOR DOMESTIC, RECREATION, AND AGRICULTURAL USES

Parameter	Domestic Source 1C	Recreation and Aesthetics 2A            2B		Agri- culture 4
BACTERIOLOGICAL (30-DAY GEOMETRIC MEAN) (NO.)/100 ML)				
Max. Total Coliforms	5000	1000	5000	
Max. Fecal Coliforms	2000	200	200	
PHYSICAL				
Min. Dissolved Oxygen (MG/L) (1)	5.5	5.5	5.5	
pH (RANGE)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
Turbidity Increase (NTU)		10	10	
METALS (ACID SOLUBLE, MAXIMUM MG/L) (2)				
Arsenic	0.05			0.1
Barium	1.0			
Cadmium	0.01			0.01
Chromium	0.05			0.10
Copper				0.2
Lead	0.05			0.1
Mercury	0.002			
Selenium	0.01			0.05
Silver	0.05			
INORGANICS (MAXIMUM MG/L)				
Boron				0.75
Fluoride (3)	1.4-2.4			
Nitrates as N	10			
Total Dissolved Solids (4)				1200
RADIOLOGICAL (MAXIMUM pCi/L)				
Gross Alpha	15			15
Radium 226, 228 (Combined)	5			
Strontium 90	8			
Tritium	20000			

ORGANICS  
(MAXIMUM UG/L)

Chlorophenoxy Herbicides	
2,4-D	100
2,4,5-TP	10
Endrin	0.2
Hexachlorocyclohexane (Lindane)	
	4
Methoxychlor	100
Toxaphene	5

POLLUTION  
INDICATORS (5)

Gross Beta (pCi/L)	50			50
BOD (MG/L)		5	5	5
Nitrate as N (MG/L)		4	4	
Phosphate as P (MG/L) (6)		0.05	0.05	

FOOTNOTES:

- (1) These limits are not applicable to lower water levels in deep impoundments.
- (2) The acid soluble method as used by the State Health Laboratory involves acidification of the sample in the field, no digestion process in the laboratory, filtration, and analysis by atomic absorption spectrophotometry. (Methods of chemical analysis of water and wastes, EPA-600/4-79-020)
- (3) Maximum concentration varies according to the daily maximum mean air temperature.

TEMP (C)	MG/L
12.0	2.4
12.1-14.6	2.2
14.7-17.6	2.0
17.7-21.4	1.8
21.5-26.2	1.6
26.3-32.5	1.4

- (4) Total dissolved solids (TDS) limits may be adjusted on a case-by-case basis.
- (5) Investigations should be conducted to develop more information where these pollution indicator levels are exceeded.
- (6) Phosphate as P (mg/l) limit for lakes and reservoirs shall be 0.025.

TABLE 2.14.2  
NUMERIC CRITERIA FOR AQUATIC WILDLIFE

Parameter	Aquatic Wildlife			
	3A	3B	3C	3D
PHYSICAL				
Total Dissolved Gases	(1)	(1)		
Dissolved Oxygen (MG/L) (2)				
30 Day Average	6.5	5.5	5.0	5.0
7 Day Average	9.5/5.0	6.0/4.0		
1 Day Average	8.0/4.0	5.0/3.0	3.0	3.0
Max. Temperature (C)	20	27	27	
Max. Temperature Change (C)	2	4	4	
pH (Range)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
Turbidity Increase (NTU)	10	10	15	15
METALS (3)				
(ACID SOLUBLE, UG/L) (4)				
Arsenic (Trivalent)				
4 Day Average	190	190	190	190
1 Hour Average	360	360	360	360
Cadmium (5)				
4 Day Average	1.1	1.1	1.1	1.1
1 Hour Average	3.9	3.9	3.9	3.9
Chromium (Hexavalent)				
4 Day Average	11	11	11	11
1 Hour Average	16	16	16	16
Chromium (Trivalent) (5)				
4 Day Average	210	210	210	210
1 Hour Average	1700	1700	1700	1700
Copper (5)				
4 Day Average	12	12	12	
1 Hour Average	18	18	18	18
Cyanide (Free)				
4 Day Average	5.2	5.2	5.2	
1 Hour Average	22	22	22	22
Iron (Maximum)				
4 Day Average	1000	1000	1000	1000
Lead (5)				
4 Day Average	3.2	3.2	3.2	3.2
1 Hour Average	82	82	82	82
Mercury				
4 Day Average	0.012	0.012	0.012	0.012
1 Hour Average	2.4	2.4	2.4	2.4
Nickel (5)				

4 Day Average	160	160	160	160
1 Hour Average	1400	1400	1400	1400
Selenium				
4 Day Average	5.0	5.0	5.0	5.0
1 Hour Average	20	20	20	20
Silver				
4 Day Average	0.12	0.12	0.12	
1 Hour Average (5)	4.1	4.1	4.1	4.1
Zinc (5)				
4 Day Average	110	110	110	110
1 Hour Average	120	120	120	120

INORGANICS  
(MG/L) (3)

Ammonia as N (Un-ionized) (6)				
4 Day Average	(6a)	(6a)		
1 Hour Average	(6b)	(6b)	(6b)	(6b)
Chlorine (Total Residual) (7)				
4 Day Average	0.011	0.011		
1 Hour Average	0.019	0.019	0.2	(8)
Hydrogen Sulfide (Undissociated, Max. UG/L)	2.0	2.0	2.0	2.0
Phenol (Maximum)	0.01	0.01	0.01	0.01

RADIOLOGICAL  
(MAXIMUM pCi/L)

Gross Alpha (9)	15	15	15	15
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ORGANICS (UG/L) (3)

Aldrin (Maximum)	1.5	1.5	1.5	1.5
Chlordane				
4 Day Average	0.0043	0.0043	0.0043	0.0043
1 Hour Average	1.2	1.2	1.2	1.2
DDT and Metabolites				
4 Day Average	0.0010	0.0010	0.0010	0.0010
1 Hour Average	0.55	0.55	0.55	0.55
Dieldrin				
4 Day Average	0.0019	0.0019	0.0019	0.0019
1 Hour Average	1.25	1.25	1.25	1.25
Endosulfan				
4 Day Average	0.056	0.056	0.056	0.056
1 Hour Average	0.11	0.11	0.11	0.11
Endrin				
4 Day Average	0.0023	0.0023	0.0023	0.0023
1 Hour Average	0.09	0.09	0.09	0.09
Guthion (Maximum)	0.01	0.01	0.01	0.01
Heptachlor				
4 Day Average	0.0038	0.0038	0.0038	0.0038

1 Hour Average	0.26	0.26	0.26	0.26
Hexachlorocyclohexane (Lindane)				
4 Day Average	0.08	0.08	0.08	0.08
1 Hour Average	1.0	1.0	1.0	1.0
Methoxychlor (Maximum)	0.03	0.03	0.03	0.03
Mirex (Maximum)	0.001	0.001	0.001	0.001
Parathion (Maximum)	0.04	0.04	0.04	0.04
PCB's				
4 Day Average	0.014	0.014	0.014	0.014
1 Hour Average	2.0	2.0	2.0	2.0
Pentachlorophenol (10)				
4 Day Average	13	13	13	13
1 Hour Average	20	20	20	20
Toxaphene				
4 Day Average	0.0002	0.0002	0.0002	0.0002
1 Hour Average	0.73	0.73	0.73	0.73

POLLUTION  
INDICATORS (9)

Gross Beta (pCi/L)	50	50	50	50
BOD (MG/L)	5	5	5	5
Nitrate as N (MG/L)	4	4	4	
Phosphate as P (MG/L) (11)	0.05	0.05		

FOOTNOTES:

- (1) Not to exceed 110% of saturation.
- (2) These limits are not applicable to lower water levels in deep impoundments. First number in column is for when early life stages are present, second number is for when all other life stages present.
- (3) Where criteria are listed as 4-day average and 1-hour average concentrations, these concentrations should not be exceeded more often than once every three years on the average.
- (4) The acid soluble method as used by the State Health Laboratory involves acidification of the sample in the field, no digestion process in the laboratory, filtration, and analysis by atomic absorption spectrophotometry. (Methods of chemical analysis of water and wastes, EPA-600/4-79-020)
- (5) Hardness dependent criteria. 100 mg/l used. See Table 2.14.3 for complete equation.
- (6) Un-ionized ammonia toxicity is dependent upon the temperature and pH of the waterbody. For detailed explanation refer to Federal Register, vol. 50, 30784, July 29, 1985.  
The following equations are used to calculate criteria concentrations:
- (6a) The 4-Day average concentration of un-ionized ammonia in

- mg/l as N  $(0.80/FT/FPH/RATIO) * 0.822$
- (6b) The 1-Hour average concentration of un-ionized ammonia in mg/l as N  $(0.52/FT/FPH/2) * 0.822$
- Where:
- FT is a function of temperature which adjusts the criteria concentration for the ambient temperature.  
 $FT = 10^{0.03(20-TCAP)}$ ; TCAP less than or equal to T less than or equal to 30  
 $= 10^{0.03(20-T)}$ ; 0 less than or equal to T less than TCAP  
 and FPH is a function of pH which adjusts the criteria concentration for ambient pH.  
 $FPH = 1$ ; 8 less than or equal to pH less than or equal to 9  
 $= (1 + 10^{7.4-pH})/1.25$ ; 6.5 less than or equal to pH less than 8.0  
 and RATIO is the ratio between acute and chronic criteria and is dependent upon pH.  
 $RATIO = 16$ ; 7.7 less than or equal to pH less than or equal to 9  
 $= 24 (10^{7.7-pH}/(1 + 10^{7.4-pH}))$ ; 6.5 less than or equal to pH less than 7.7  
 and TCAP is the maximum temperature that the criteria can be applied and is dependent upon the aquatic community present (i.e., warm water or cold water).  
 For Class 3A only: TCAP = 15C in equation 6a  
 = 20C in equation 6b  
 For Class 3B: TCAP = 20C in equation 6a  
 For Classes 3B, 3C, and 3D:  
 TCAP = 25C in equation 6b  
 For Tables of values, see following page.
- (7) Special case segments and maximum TRC concentrations as follows:
- Mill Race from Interstate Highway 15 to the Provo City wastewater treatment plant discharge 0.2 mg/l  
 Iron-ton Canal (Utah County), from Utah Lake (Provo Bay) to East boundary of Denver and Rio Grande Western Railroad right-of-way 0.05 mg/l  
 Beer Creek (Utah County) from 4850 West (in NE1/4NE1/4 sec. 36, T.8 S., R.1 E.) to headwaters 0.3 mg/l
- (8) Numeric criteria determined on a case-by-case basis.
- (9) Investigations should be conducted to develop more information where these levels are exceeded.
- (10) pH dependent criteria. pH 7.8 used in table. See Table 2.14.4 for equation.
- (11) Phosphate as P (mg/l) limit for lakes and reservoirs shall be 0.025.



1-HOUR AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3A WATERS  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.008	0.011	0.015	0.021	0.030	0.030	0.030
7.00	0.019	0.027	0.038	0.054	0.076	0.076	0.076
7.50	0.037	0.053	0.075	0.105	0.149	0.149	0.149
8.00	0.054	0.076	0.107	0.151	0.214	0.214	0.214
8.50	0.054	0.076	0.107	0.151	0.214	0.214	0.214
9.00	0.054	0.076	0.107	0.151	0.214	0.214	0.214

4-DAY AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3A WATERS  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.001	0.001	0.001	0.002	0.002	0.002	0.002
7.00	0.002	0.002	0.003	0.005	0.005	0.005	0.005
7.50	0.005	0.008	0.011	0.015	0.015	0.015	0.015
8.00	0.010	0.015	0.021	0.029	0.029	0.029	0.029
8.50	0.010	0.015	0.021	0.029	0.029	0.029	0.029
9.00	0.010	0.015	0.021	0.029	0.029	0.029	0.029

1-HOUR AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3B, 3C, AND 3D WATERS  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.008	0.011	0.015	0.021	0.030	0.042	0.042
7.00	0.019	0.027	0.038	0.054	0.076	0.107	0.107
7.50	0.037	0.053	0.075	0.105	0.149	0.210	0.210
8.00	0.054	0.076	0.107	0.151	0.214	0.302	0.302
8.50	0.054	0.076	0.107	0.151	0.214	0.302	0.302
9.00	0.054	0.076	0.107	0.151	0.214	0.302	0.302

4-DAY AVERAGE CONCENTRATION OF UN-IONIZED AMMONIA AS N (MG/L)  
FOR CLASS 3B WATERS  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.001	0.001	0.001	0.002	0.002	0.002	0.002
7.00	0.002	0.002	0.003	0.005	0.007	0.007	0.007
7.50	0.005	0.008	0.011	0.015	0.022	0.041	0.041
8.00	0.010	0.015	0.021	0.029	0.041	0.041	0.041
8.50	0.010	0.015	0.021	0.029	0.041	0.041	0.041
9.00	0.010	0.015	0.021	0.029	0.041	0.041	0.041

TABLE 2.14.3  
EQUATIONS FOR PARAMETERS WITH HARDNESS (1) DEPENDENCE

Parameter	4-Day Average Concentration (UG/L)	1-Hour Average Concentration (UG/L)
CADMIUM	$e^{(0.7852(\ln(\text{hardness})) - 3.490)}$	$e^{(1.128(\ln(\text{hardness})) - 3.828)}$
CHROMIUM (TRIVALENT)	$e^{(0.8190(\ln(\text{hardness})) + 1.561)}$	$e^{(0.8190(\ln(\text{hardness})) + 3.688)}$
COPPER	$e^{(0.8545(\ln(\text{hardness})) - 1.465)}$	$e^{(0.9422(\ln(\text{hardness})) - 1.464)}$
LEAD	$e^{(1.273(\ln(\text{hardness})) - 4.705)}$	$e^{(1.273(\ln(\text{hardness})) - 1.460)}$
NICKEL	$e^{(0.8460(\ln(\text{hardness})) + 1.1645)}$	$e^{(0.8460(\ln(\text{hardness})) + 3.3612)}$
SILVER	N/A	$e^{(1.72(\ln(\text{hardness})) - 6.52)}$
ZINC	$e^{(0.8473(\ln(\text{hardness})) + 0.7614)}$	$e^{(0.8473(\ln(\text{hardness})) + 0.8604)}$

FOOTNOTE:

(1) Hardness as mg/l  $\text{CaCO}_3$ .

TABLE 2.14.4  
EQUATIONS FOR PENTACHLOROPHENOL  
(pH DEPENDENT)

4-Day Average Concentration (UG/L)	1-Hour Average Concentration (UG/L)
$e^{(1.005(\text{pH})) - 5.290}$	$e^{(1.005(\text{pH})) - 4.830}$

TABLE 2.14.5  
SITE SPECIFIC CRITERIA FOR UN-IONIZED AMMONIA AND DISSOLVED OXYGEN  
FOR JORDAN RIVER AND SURPLUS CANAL SEGMENTS  
(SEE SECTION 2.13)

DISSOLVED OXYGEN:

May-July

7-day average	5.5 mg/l
30-day average	5.5 mg/l
Instantaneous minimum	4.5 mg/l

August-April

30-day average	5.5 mg/l
Instantaneous minimum	4.0 mg/l

Un-ionized Ammonia as N:

(1) Maximum concentration should not exceed the numerical value given by the following:

$$0.15 \times (f(T) / f(pH)) \times 2.989$$

where:

$$f(T) = 1; T \text{ greater than or equal to } 10C$$

$$= (1 + 10^{(9.73-pH)}) / (1 + 10^{(pK_t - pH)}); T \text{ less than } 10C$$

$$f(pH) = 1 + 10^{(1.03(7.32-pH))}$$

$$pK_t = 0.090 + (2730 / (T + 273.2))$$

(2) The average concentration over any 30 consecutive days should be less than the value given by the following:

$$0.031 \times (f(T) / f(pH)) \times 1.774$$

where:

$$f(pH) = 1; pH \text{ greater than or equal to } 7.7$$

$$= 10^{(0.74(7.7-pH))}; pH \text{ less than } 7.7$$

$$f(T) = 1; T \text{ greater than or equal to } 10C$$

$$= (1 + 10^{(9.73-pH)}) / (1 + 10^{(pK_t - pH)}); T \text{ less than } 10C$$

MAXIMUM CONCENTRATION UN-IONIZED AMMONIA AS N (MG/L)  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.025	0.038	0.056	0.056	0.056	0.056	0.056
6.75	0.041	0.062	0.092	0.092	0.092	0.092	0.092
7.00	0.064	0.096	0.143	0.143	0.143	0.143	0.143
7.25	0.091	0.138	0.206	0.206	0.206	0.206	0.206
7.50	0.121	0.183	0.271	0.271	0.271	0.271	0.271
7.75	0.147	0.222	0.330	0.330	0.330	0.330	0.330
8.00	0.168	0.253	0.374	0.374	0.374	0.374	0.374
8.25	0.183	0.274	0.404	0.404	0.404	0.404	0.404
8.50	0.194	0.289	0.423	0.423	0.423	0.423	0.423
8.75	0.203	0.301	0.434	0.434	0.434	0.434	0.434
9.00	0.214	0.312	0.440	0.440	0.440	0.440	0.440

30-DAY AVERAGE CONCENTRATION UN-IONIZED AMMONIA AS N (MG/L)  
TEMPERATURE (C)

pH	0.00	5.00	10.00	15.00	20.00	25.00	30.00
6.50	0.003	0.005	0.007	0.007	0.007	0.007	0.007
6.75	0.005	0.007	0.011	0.011	0.011	0.011	0.011
7.00	0.007	0.011	0.017	0.017	0.017	0.017	0.017
7.25	0.011	0.017	0.026	0.026	0.026	0.026	0.026
7.50	0.017	0.026	0.039	0.039	0.039	0.039	0.039
7.75	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.00	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.25	0.025	0.037	0.055	0.055	0.055	0.055	0.055
8.50	0.025	0.038	0.055	0.055	0.055	0.055	0.055
8.75	0.026	0.038	0.055	0.055	0.055	0.055	0.055
9.00	0.027	0.039	0.055	0.055	0.055	0.055	0.055

TABLE 2.14.6  
NUMERIC CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

Pollutant	Maximum Concentration (micrograms/L)	
	Class 1C (1)	Class 3 (2)
Acenaphthene	20 (4)	
Acrolein	320	780
Acrylonitrile (3)	0.058	0.65
Aldrin (3)	0.000074	0.000079
Antimony	146	45000
Arsenic (3)	0.002	0.017
Benzene (3)	0.66	40.0
Benzidene (3)	0.00012	0.00053
Beryllium (3)	0.0037	0.064
Cadmium	10 (5)	
Carbon Tetrachloride (3)	0.40	6.94
Chlordane (3)	0.00046	0.00048
Chlorinated Benzenes		
Hexachlorobenzene (3)	0.00072	0.00074
Chlorobenzene	20 (4)	
Chlorinated Ethanes		
1,2-Dichloroethane (3)	0.94	243
1,1,1-Trichloroethane	200 (5)	1030000
1,1,2-Trichloroethane (3)	0.60	41.8
1,1,2,2-Tetrachloroethane (3)	0.17	10.7
Hexachloroethane (3)	1.9	8.74
Chlorinated Phenols		
2,4,6-Trichlorophenol (3)	1.2	3.6
p-Chloro-m-cresol	3000 (4)	
Chloroalkyl ethers		
Bis(2-chloroethyl) ether (3)	0.03	1.36
Bis(2-Chloroisopropyl) ether	34.7	4360
Chloroform (3)	0.19	15.7
2-Chlorophenol	0.1 (4)	
Chromium (III)	50 (5)	3433000
Chromium (VI)	50 (5)	
Copper	1000 (4)	
Cyanide (total)	200 (5)	
DDT and Metabolites		
4,4'-DDT (3)	0.0000024	0.0000024
4,4'-DDE (3)	0.0000024	0.0000024
4,4'-DDD (3)	0.0000024	0.0000024
Dichlorobenzenes		
1,2-Dichlorobenzene	400	2600

1,3-Dichlorobenzene	400	2600
1,4-Dichlorobenzene	75 (5)	2600
Dichlorobenzidenes		
3,3'-Dichlorobenzidine (3)	0.01	0.02
Dichloroethylenes		
1,1-Dichloroethylene (3)	0.033	1.85
2,4-Dichlorophenol	0.3 (5)	
Dichloropropanes/ Dichloropropenes		
1,3-Dichloropropylene	87	14100
Dieldrin (3)	0.000071	0.000076
2,4-Dimethylphenol	400 (4)	
2,4-Dinitrotoluene (3)	0.11	9.1
1,2-Diphenylhydrazine (3)	0.042	0.56
Dioxin (2,3,7,8-TCDD) (3)	$1.3 \times 10^{-8}$	$1.4 \times 10^{-8}$
Endosulfan		
alpha-Endosulfan	74	159
beta-Endosulfan	74	159
Endosulfan sulfate	74	159
Endrin	0.2 (5)	
Endrin aldehyde	0.2 (5)	
Ethylbenzene	1400	3260
Fluoroanthene	42	54
Halomethanes		
Methylene chloride (3)	0.19	15.7
Methyl chloride (3)	0.19	15.7
Methyl bromide (3)	0.19	15.7
Bromoform (3)	0.19	15.7
Dichlorobromomethane (3)	0.19	15.7
Chlorodibromomethane (3)	0.19	15.7
Heptachlor (3)	0.00028	0.00029
Heptachlor epoxide (3)	0.00028	0.00029
Hexachlorobutadiene (3)	0.45	50
Hexachlorocyclohexane		
Hexachlorocyclohexane-alpha (3)	0.0092	0.031
Hexachlorocyclohexane-beta (3)	0.016	0.055
Hexachlorocyclohexane-gamma (3)	0.019	0.063
Hexachlorocyclopentadiene	1.0 (5)	
Isophorone	5200	520000
Lead	50 (5)	
Mercury	0.144	0.146
Nickel	13.4	100
Nitrobenzene	30 (5)	
Nitrophenols		
4,6-Dinitro-o-cresol	13.4	765
2,4-Dinitrophenol	70	14300
Nitrosamines		

N-Nitrosodimethylamine (3)	0.0014	16
N-Nitrosodiphenylamine (3)	4.9	16.1
Pentachlorophenol	30 (5)	
Phenol	300 (5)	
Phthalate Esters		
Dimethyl phthalate	313000	2900000
Diethyl phthalate	350000	1800000
Di-n-butyl phthalate	34000	154000
Bis(2-ethylhexyl) phthalate (3)	15000	50000
Polychlorinated Biphenyls		
PCB 1242 (3)	0.000079	0.000079
PCB 1254 (3)	0.000079	0.000079
PCB 1221 (3)	0.000079	0.000079
PCB 1232 (3)	0.000079	0.000079
PCB 1248 (3)	0.000079	0.000079
PCB 1260 (3)	0.000079	0.000079
PCB 1016 (3)	0.000079	0.000079
Polynuclear Aromatic Hydrocarbons		
Benzo(a)anthracene (3)	0.0028	0.0311
Benzo(a)pyrene (3)	0.0028	0.0311
Benzo(b)fluoranthene (3)	0.0028	0.0311
Benzo(k)fluoranthene (3)	0.0028	0.0311
Chrysene (3)	0.0028	0.0311
Acenaphthylene (3)	0.0028	0.0311
Anthracene (3)	0.0028	0.0311
Benzo(g,h,i)perylene (3)	0.0028	0.0311
Fluorene (3)	0.0028	0.0311
Phenanthrene (3)	0.0028	0.0311
Dibenzo(a,h)anthracene (3)	0.0028	0.0311
Indeno(1,2,3-cd) pyrene (3)	0.0028	0.0311
Pyrene (3)	0.0028	0.0311
Selenium	10 (5)	
Silver	50 (5)	
Tetrachloroethylene (3)	0.80	8.85
Thallium	13	48
Toluene	14300	424000
Toxaphene (3)	0.00071	0.00073
Trichloroethylene (3)	2.7	80.7
Vinylchloride (3)	2.0 (5)	525
Zinc	5000 (4)	
Asbestos (3)	30000 (6)	30000 (6)

FOOTNOTES:

- (1) Human health criteria will be applied to all class 1C waterbodies to protect for the consumption of water and aquatic organisms.
- (2) Human health criteria will be applied to all class 3 waterbodies (i.e. 3A, 3B, 3C, 3D) to

protect for the consumption of aquatic organisms only.

- (3) Carcinogenic compound. Human health criteria have been calculated using a  $10^{-6}$  incremental risk factor.
- (4) Criterion based on organoleptic data to control undesirable taste and odor quality of ambient waters.
- (5) Criteria based on drinking water maximum contaminant levels (MCL).
- (6) Concentration in fibers/L.

**KEY: water pollution, water quality standards  
1991**

**26-11**

**R448-6 Ground Water Quality Protection**

**R448-6-1 Definitions**

1.1 "Aquifer" means a geologic formation, group of geologic formations or part of a geologic formation that contains sufficiently saturated permeable material to yield useable quantities of water to wells and springs.

1.2 "Background Concentration" means the concentration of a pollutant in ground water upgradient or lateral gradient from a facility, practice or activity, and which has not been affected by that facility, practice or activity.

1.3 "Best Available Technology" means the application of design, equipment, work practice, operation standard or combination thereof, at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.

1.4 "Committee" means the Utah Water Pollution Control Committee.

1.5 "Community Drinking Water System" means a public drinking water system which serves at least fifteen service connections used by year-round residents or regularly serves at least twenty-five year-round residents.

1.6 "Comparable Quality (Source)" means a potential alternative source or sources of water supply which has the same general quality as the ground water source.

1.7 "Comparable Quantity (Source)" means a potential alternative source of water supply capable of reliably supplying water in quantities sufficient to meet the year-round needs of the users served by the ground water source.

1.8 "Compliance Monitoring Point" means a well located where ground water is monitored to determine compliance with applicable class total dissolved solids (TDS) limits, ground water quality standards, protection levels, or alternate concentration limits.

1.9 "Contaminant" means any physical, chemical, biological or radiological substance or matter in water.

1.10 "Conventional Treatment" means normal and usual treatment of water for distribution in public drinking water supply systems including flocculation, sedimentation, filtration, disinfection and storage.

1.11 "Discharge" means the release of a pollutant directly or indirectly into subsurface waters of the state.

1.12 "Existing Facility" means a facility or activity that was in operation or under construction within 180 days after the effective date of this regulation.

1.13 "Economically Infeasible" means the cost to the typical water user for replacement water would exceed the community's ability to pay.

1.14 "Executive Secretary" means the Executive Secretary of the Utah Water Pollution Control Committee.



1.15 "Facility" means any building, structure, processing, handling, or storage facility, equipment or activity; or contiguous group of buildings, structures, or processing, handling or storage facilities, equipment, or activities or combination thereof.

1.16 "Gradient" means the change in total water pressure head per unit of distance.

1.17 "Ground Water" means subsurface water in the zone of saturation including perched ground water.

1.18 "Ground Water Quality Standards" means numerical contaminant concentration levels adopted by the Committee for the protection of the subsurface waters of the State.

1.19 "Infiltration" means the movement of water through the pores of rock, soil or sediment.

1.20 "Institutional Constraints" means legal or other restrictions that preclude replacement water delivery and which cannot be alleviated through administrative procedures or market transactions.

1.21 "Lateral Gradient" means a point located hydraulically equal to a facility and in the same ground water such that the ground water at that point has not been affected by the facility.

1.22 "Limit of Detection" means the concentration of a chemical below which it can not be detected using currently accepted sampling and analytical techniques for drinking water as determined by the U.S. Environmental Protection Agency.

1.23 "New Facility" means a facility for which construction or modification is initiated 180 days or more after the effective date of these regulations.

1.24 "Person" means any individual, corporation, partnership, association, company or body politic, including any agency or instrumentality of the federal, state, or local government.

1.25 "Point of Discharge" means the outermost location at which effluent or leachate has been stored, applied, disposed of, or discharged; for a diked facility, the outermost edge of the dikes.

1.26 "Pollutant" means dredged spoil, solid waste, incinerator residue, sewage, sewage sludge, garbage, munitions, trash, chemical waste, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, or any industrial, municipal or agricultural waste discharged into waters of the state.

1.27 "Pollution" means such contamination, or other alteration of the physical, chemical, or biological properties of any waters of the State, or such discharge of any liquid, gaseous, or solid substance into any waters of the state as will create a nuisance or render such waters harmful or detrimental or injurious to public health, safety, or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

1.28 "Protection Level" means a percentage of a ground water quality standard or background concentration or a pollutant concentration limit based upon the ground water class used for establishing performance standards for a facility that discharges or would probably discharge to ground water.

1.29 "Substantial Treatment" means treatment of water utilizing specialized treatment methods including ion exchange, reverse osmosis, electrodialysis and other methods needed to upgrade water quality to meet standards for public water systems.

1.30 "Total Dissolved Solids (TDS)" means the quantity of dissolved material in a sample of water which is determined by weighing the solid residue obtained by evaporating a measured volume of a filtered sample to dryness; or for many waters that contain more than 1000 mg/l, the sum of the chemical constituents.

1.31 "Radius of Influence" means the radial distance from the center of a well bore to the point where there is no lowering of the water table or potentiometric surface because of pumping of the well; the edge of the cone of depression.

1.32 "Upgradient" means a point located hydraulically above a facility such that the ground water at that point has not been impacted by discharges from the facility.

1.33 "Vadose Zone" means the zone of aeration including soil and capillary water. The zone is bound above by the land surface and below by the water table.

1.34 "Water Table" means the top of the saturated zone of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

1.35 "Water Table Aquifer" means an aquifer extending downward from the water table to the first confining bed.

1.36 "Waters of the State" means all streams, lakes, ponds, marshes, water courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion thereof; except bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance or a public health hazard, or a menace to fish and wildlife, shall not be considered to be "waters of the state" under this definition.

1.37 "Wellhead Protection Area" means the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which pollutants are reasonably likely to move toward and reach such water well or well field.

1.38 "Zone of Influence" means the area contained by the outer edge of the drawdown cone of a water well.

#### **R448-6-2 Ground Water Quality Standards**

The following Ground Water Quality Standards as listed in Table I are adopted for protection of ground water quality.

Table 1  
Ground Water Quality Standards

Parameter	Milligrams per liter (mg/l) unless noted otherwise and based on analysis of filtered sample except for Mercury
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and organic compounds

PHYSICAL CHARACTERISTICS

Color (units)	15.0
Corrosivity (characteristic)	noncorrosive
Odor (threshold number)	3.0
pH (units)	6.5-8.5

INORGANIC CHEMICALS

Fluoride	2.4
Foaming agents	0.5
Nitrate (as N)	10.0

METALS

Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Copper	1.0
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Zinc	5.0

ORGANIC CHEMICALS

Pesticides	
2, 4-D	0.1
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2, 4, 5-TP Silvex	0.01

VOLATILE ORGANIC CHEMICALS

Trichloroethylene	0.005
Carbon tetrachloride	0.005
Vinyl chloride	0.002
1, 2 - Dichloroethane	0.005
Benzene	0.005
1, 1 - Dichloroethylene	0.007
1, 1, 1 - Trichloroethane	0.200
para - Dichlorobenzene	0.075

OTHER ORGANIC CHEMICALS

Trihalomethanes	0.1
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Radionuclides

The following are the maximum contaminant levels for Radium-226 and Radium-228, and gross alpha particle radioactivity: Combined Radium-226 and Radium-228.....5pCi/l.

Gross alpha particle activity, including radium-226 but excluding Radon and Uranium.....15pCi/l.

Beta particle and photon radioactivity from man-made radionuclides:

The average annual concentration of beta particle and photon radioactivity from man-made radionuclides shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year.

Except for the radionuclides listed in the table below, the

concentration of man-made radionuclides causing four millirem total body or organ dose equivalents shall be calculated on the basis of a two liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burden and Maximum Permissible Concentration Exposure", NBS Handbook 69 as amended August 1962, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four millirem/year. Average annual concentrations assumed to produce a total body or organ dose of four millirem/year.

Radionuclide	Critical Organ	pCi per liter
Tritium	Total Body	20,000
Strontium-90	Bone Marrow	8

#### **R448-6-3 Ground Water Classes**

##### **3.1 GENERAL**

The following ground water classes are established: Class IA - Pristine Ground Water; Class 1B - Irreplaceable Ground Water; Class IC - Ecologically Important Ground Water; Class II - Drinking Water Quality Ground Water; Class III - Limited Use Ground Water; Class IV - Saline Ground Water and Unclassified.

##### **3.2 CLASS 1A - PRISTINE GROUND WATER**

Class IA ground water has the following characteristics:

- A. Total dissolved solids of less than 500 mg/l.
- B. No contaminant concentrations that exceed the ground water quality standards listed in Table 1.

##### **3.3 CLASS 1B - IRREPLACEABLE GROUND WATER**

Class IB ground water is a source of water for a community public drinking water system for which no reliable supply of comparable quality and quantity is available because of economic or institutional constraints.

##### **3.4 CLASS IC - ECOLOGICALLY IMPORTANT GROUND WATER**

Class IC ground water is a source of ground water discharge important to the continued existence of wildlife habitat.

##### **3.5 CLASS II - DRINKING WATER QUALITY GROUND WATER**

Class II ground water has the following characteristics:

- A. Total dissolved solids greater than 500 mg/l and less than 3000 mg/l.
- B. No contaminant concentrations that exceed ground water quality standards in Table 1.

##### **3.6 CLASS III - LIMITED USE GROUND WATER**

Class III ground water has one or both of the following characteristics:

- A. Total dissolved solids greater than 3000 mg/l and less than 10,000 mg/l, or;
- B. One or more contaminants that exceed the ground water quality standards listed in Table 1.

##### **3.7 CLASS IV - SALINE GROUND WATER**

Class IV ground water will be characterized by total dissolved solids greater than 10,000 mg/l.

##### **3.8 UNCLASSIFIED GROUND WATER**

Unclassified designates ground water that has not been

classified as Class I through Class IV. The quality of ground water will be protected to a degree commensurate with current and probable future beneficial uses of the ground water as determined by the existing ground water quality in unclassified areas.

#### **R448-6-4 Ground Water Class Protection Levels**

##### **4.1 GENERAL**

A. The ground water class protection levels set ground water numerical criteria for the operation of facilities that discharge or would probably discharge to ground water. The class protection levels are site-specific ground water quality numerical values that are: a percentage of established ground water quality standards or background concentrations; or a limit on pollutant concentration.

B. For the physical characteristics (color, corrosivity, odor, and pH) and radionuclides listed in Table 1, the values listed are the protection levels for all ground water classes.

C. Any person who constructs or operates a facility that discharges or would probably discharge to ground water must meet the applicable protection levels, class TDS limits, alternate concentration limits or ground water quality standards for the ground water that may be affected by the discharge.

##### **4.2 CLASS IA PROTECTION LEVELS**

A. Class IA ground water will be protected to the maximum extent feasible from degradation due to facilities that discharge or would probably discharge to ground water.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.1 times the background value.

2. In no case will the total dissolved solids increase above 500 mg/l.

3. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 0.1 times the ground water quality standard value, or exceed the limit of detection whichever is greater.

4. When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 1.1 times the background concentration or exceed 0.1 times the ground water quality standard whichever is greater.

5. In no case will the concentration of a pollutant be allowed to exceed the ground water quality standard.

##### **4.3 CLASS IB PROTECTION LEVELS**

A. Class IB ground water will be protected as an irreplaceable source of drinking water.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.1 times the background value and cannot exceed 2000 mg/l.

2. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 0.1 times the ground water quality standard, or the limit of detection whichever is greater.

3. When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 1.1 times the background concentration or exceed 0.1 times the ground water quality standard whichever is greater.

4. In no case will the concentration of a pollutant be allowed to exceed the ground water quality standard.

#### 4.4 CLASS IC PROTECTION LEVELS

Class IC ground water will be protected as a source of water for potentially affected wildlife habitat. Limits on increases of total dissolved solids and organic and inorganic chemical compounds will be determined to meet appropriate surface water standards.

#### 4.5 CLASS II PROTECTION LEVELS

A. Class II ground water will be protected for use as drinking water or other similar beneficial use with conventional treatment prior to use.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.25 times the background value.

2. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 0.25 times the ground water quality standard, or exceed the limit of detection whichever is greater.

3. When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 1.25 times the background concentration or exceed 0.25 times the ground water quality standard whichever is greater.

4. In no case will the concentration of a pollutant be allowed to exceed the ground water quality standard.

#### 4.6 CLASS III PROTECTION LEVELS

A. Class III ground water will be protected as a potential source of drinking water, after substantial treatment, and as a source of water for industry and agriculture.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.25 times the background concentration level.

2. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 0.5 times the ground water quality standard, or the limit of detection whichever is greater.

3. When a contaminant is present in a detectable amount as a background concentration, the concentration of the pollutant may not exceed 1.5 times the background concentration or exceed 0.5 times the ground water quality standard whichever is greater.

4. In no case will the concentration of a pollutant be allowed to exceed the ground water quality standard. If the background concentration exceeds the ground water quality standard no increase will be allowed.

#### 4.7 CLASS IV PROTECTION LEVELS

Protection levels for class IV ground water will be established to protect human health and the environment.

#### 4.8 PROTECTION LEVELS FOR UNCLASSIFIED GROUND WATER

The ground water protection levels for unclassified ground water areas will be determined by the existing ground water quality.

### **R448-6-5 Ground Water Classification for Aquifers**

#### 5.1 GENERAL

A. When sufficient information is available, entire aquifers

or parts thereof may be classified by the Committee according to the quality of ground water contained therein and commensurate protection levels will be applied.

B. Ground water sources furnishing water to community drinking water systems with ground water meeting Class IA criteria are classified as Class IA within the well head protection area.

#### 5.2 CLASSIFICATION AND RECLASSIFICATION PROCEDURE

A. The Committee may initiate classification or reclassification.

B. Any person may petition the Committee for classification and reclassification.

C. Boundaries for class areas will be delineated so as to enclose distinct ground water classes as nearly as known facts permit. Boundaries will be based on hydrogeologic properties, existing ground water quality and for Class IB and IC, current use. Parts of an aquifer may be classified differently.

D. The petitioner requesting reclassification will provide sufficient information to determine if reclassification is in the best interest of the beneficial users.

E. The petition for classification and reclassification will include:

1. factual data supporting the proposed classification;
2. a description of the proposed ground waters to be classified or reclassified;
3. potential contamination sources;
4. ground water flow direction;
5. current beneficial uses of the ground water; and
6. location of all water wells in the area to be classified or reclassified.

F. One or more public hearings will be held to receive comment on classification and reclassification proposals.

G. The Committee will determine the disposition of all petitions for classification and reclassification.

#### **R448-6-6 Implementation**

##### **6.1 DUTY TO APPLY FOR A GROUND WATER DISCHARGE PERMIT**

A. No person may construct, modify, install, or operate any new facility, not permitted by rule under R448-6-6.2, which discharges or would probably result in a discharge of pollutants that may move directly or indirectly into ground water, including, but not limited to land application of wastes; waste storage pits; waste storage piles; landfills and dumps; large feedlots; mining, milling and metallurgical operations, including heap leach facilities; and pits, ponds, and lagoons whether lined or not, without an approved ground water discharge permit from the Executive Secretary. A ground water discharge permit application should be submitted at least 180 days before the permit is needed.

B. All persons who construct, modify, install, or operate any existing facility, not permitted by rule under R448-6-6.2, which discharges or would probably result in a discharge of pollutants that may move directly or indirectly into ground water, including, but not limited to: land application of wastes; waste storage pits; waste storage piles; landfills and dumps; large feedlots; mining, milling and metallurgical operations, including heap leach

facilities; and pits, ponds, and lagoons whether lined or not, must submit a notification of the nature and location of the discharge to the Executive Secretary within 180 days following the effective date of these Regulations and must submit an application for a ground water discharge permit within one year after receipt of written notice from the Executive Secretary that a ground water discharge permit is required.

6.2 GROUND WATER DISCHARGE PERMIT BY RULE

A. Except as provided in R448-6-6.2B, the following facilities are considered to be permitted by rule and are not required to obtain a discharge permit under Section 6.1 or comply with any other provisions of these rules except that these facilities are subject to the requirement that any discharge shall not cause any ground water to exceed the ground water quality standards in Section R448-6-2 or the applicable class TDS limits in Section R448-6-3.1 to 3.7. If the discharge is to a Class III water where the background concentration exceeds the ground water quality standard no increase over background will be allowed for:

1. facilities with effluent or leachate which has been demonstrated to the satisfaction of the Executive Secretary to conform and will not deviate from the applicable class TDS limits, ground water quality standards, protection levels or alternate concentration limits and does not contain any contaminant that may present a threat to human health, the environment or its potential beneficial uses of the ground water. The Executive Secretary may require samples to be analyzed for the presence of contaminants before the effluent or leachate discharges directly or indirectly into ground water.

If the discharge is by seepage through natural or altered natural materials, the Executive Secretary may require samples of the solution be analyzed for the presence of pollutants before or after seepage;

2. water used for watering of lawns, gardens, or shrubs or for irrigation for the revegetation of a disturbed land area except for the direct land application of wastewater;

3. application of agricultural chemicals including fertilizers, herbicides and pesticides including but not limited to, insecticides fungicides, rodenticides and fumigants when used in accordance with current scientifically based manufacturer's recommendations for the crop, soil, and climate and in accordance with state and federal statutes, regulations, permits, and orders adopted to avoid ground water pollution;

4. water used for irrigated agriculture except for the direct land application of wastewater from municipal, industrial or mining facilities;

5. flood control systems including detention basins, catch basins and wetland treatment facilities used for collecting or conveying storm water runoff;

6. natural ground water seeping or flowing into conventional mine workings which re-enters the ground by natural gravity flow prior to pumping or transporting out of the mine and without being used in any mining or metallurgical process;

7. leachate which results entirely from the direct natural infiltration of precipitation through undisturbed materials;



8. wells regulated under the underground injection control (UIC) program;

9. land application of livestock wastes, within expected crop nitrogen uptake;

10. individual subsurface wastewater disposal systems approved by local health departments or large subsurface wastewater disposal systems approved by the Committee;

11. produced water pits, built, operated, regulated and maintained under Sections R615-9-1 through R615-9-9 of the Oil and Gas Conservation General Rules of the Division of Oil, Gas, and Mining;

12. reserve pits regulated under Section R615-3-16 of the Oil and Gas Conservation General Rules by the Division of Oil, Gas, and Mining;

13. storage tanks installed or operated under regulations adopted by the Utah Solid and Hazardous Waste Committee;

14. coal mining operations or facilities regulated under the Coal Mining and Reclamation Act by the Utah Division of Oil, Gas, and Mining (DOGM). The submission of an application for ground water discharge permit under Part B may be required only if the Executive Secretary, after consideration of recommendations, if any, by DOGM, determines that the discharge violates applicable ground water quality standards, applicable Class TDS limits, or is interfering with a reasonable foreseeable beneficial use of the ground water. DOGM is not required to establish any administrative or regulatory requirements which are in addition to the rules of DOGM for coal mining operations or facilities to implement these ground water regulations;

15. hazardous waste management units permitted under the Utah Hazardous Waste Management Regulations;

16. facilities or portions of facilities with active ground water remediation programs conducted under the Resources Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA);

17. feedlots not in excess of the "criteria of number only" as specified in section R448-8-3.5(5)(a) for Utah Pollution Discharge Elimination System (UPDES) permits;

18. mining, or processing or milling facilities handling less than 10 tons per day of metallic and/or nonmetallic ore and waste rock, not to exceed 2500 tons/year in aggregate;

19. pipelines and above-ground storage tanks; and,

20. drilling operations for metallic minerals, nonmetallic minerals, water, hydrocarbons, or geothermal energy sources when done in conformance with applicable regulations of the Utah Division of Oil, Gas, and Mining or the Utah Division of Water Rights; and,

21. facilities and modifications thereto which the Executive Secretary determines after a review of the application will have a de minimus actual or potential effect on ground water quality by the Executive Secretary for any discharge permitted by rule under R448-6-6.2.

B. The submission of an application for a ground water discharge permit may be required by the Executive Secretary for any discharge permitted by rule under R448-6-6.2 if it is determined

that the discharge may be causing or is likely to cause increases above the ground water quality standards or applicable class TDS limits under R448-6-3 or otherwise is interfering or may interfere with probable future beneficial use of the ground water.

#### 6.3 APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT APPROVAL

A. Unless otherwise determined by the Executive Secretary, the application for approval of a permit to discharge wastes or pollutants to ground water shall include, but is not limited to, the following complete information:

1. the name and address of the owner of the facility and the name and address of the operator if different than the owner. A corporate application must be signed by an officer of the corporation. The name and address of the contact, if different than above, and telephone numbers for all listed names shall be included;

2. legal location of the facility by county, quarter-quarter section, township, and range;

3. name of the facility and the type of facility, including the expected facility life;

4. a plat map showing all wells, water bodies, drainages, natural or man-made structures and water usage within a one-mile radius of the discharge. The plat map must show the location and depth of existing or proposed wells to be used for monitoring ground water quality;

5. geologic, hydrologic, and agricultural description of the geographic area within a one-mile radius of the point of discharge, including topography, soil types, aquifers, ground water flow direction, ground water quality, aquifer material, and well logs. The hydrologic description must include a projected area of influence;

6. the type, source, and chemical, physical, radiological, and toxic characteristics of the effluent or leachate to be discharged; the average and maximum daily amount of effluent or leachate discharged (gpd), the discharge rate (gpm), and the expected concentrations of any contaminant (mg/l) listed in the ground water quality standards in each discharge or combination of discharges. If more than one discharge point is used, information for each point must be given individually;

7. information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the applicable class TDS limits, ground water quality standards, class protection levels or alternate concentration limit;

8. for areas where the ground water has not been classified by the Committee, information on the quality of the receiving ground water sufficient to determine the applicable protection levels;

9. proposed monitoring plan, which includes a description, where appropriate, of the following:

a. ground water monitoring to, at a minimum, determine ground

water flow direction and gradient, background quality at the site, and the quality of ground water at the compliance monitoring point;

- b. installation, use and maintenance of monitoring devices;
- c. description of the compliance monitoring area defined by the compliance monitoring points including the dimensions and hydrologic and geologic data used to determine the dimensions;
- d. monitoring of the vadose zone;
- e. measures to prevent ground water contamination after the cessation of operation, including post-operational monitoring;
- f. monitoring well construction and ground water sampling which conform to A Guide to the Selection of Materials for Monitoring Well Construction and Ground Water Sampling, (1983) and RCRA Ground Water Monitoring Technical Enforcement Guidance Manual (1986), unless otherwise specified by the Executive Secretary;
- g. description and justification of parameters to be monitored.

10. plans and specifications relating to construction, modification, and operation of discharge systems;

11. description of the ground water most likely to be affected by the discharge, including water quality information of the receiving ground water prior to discharge, a description of the aquifer in which the ground water occurs, the depth to the ground water, the saturated thickness, flow direction, porosity, hydraulic conductivity, and flow systems characteristics;

12. distance to the nearest well, the use and the water quality of that well, and a listing of all water wells within a 2-mile radius of the point of discharge and the status of each;

13. compliance sampling plan which includes provisions for sampling of effluent and for flow monitoring, to determine the volume and chemistry of the discharge onto or below the surface of the ground and a plan for sampling monitoring wells and appropriate nearby water wells including the parameters to be sampled. Sampling and analytical methods must conform with the following references and analysis must be performed by certified laboratories unless otherwise specified by the Executive Secretary:

a. Standard Methods for the Examination of Water and Wastewater, sixteenth edition, 1985; Library of Congress catalogue number: 55-1979, ISBN:0-87553-131-8.

b. E.F.A. Methods, Methods for Chemical Analysis of Water and Wastes, 1983; Stock Number EPA-600/4-79-020.

c. Techniques of Water Resource Investigation of the U.S. Geological Survey, (1982); Book 5, Chapter A3.

d. Monitoring requirements in 40 CFR parts 141 and 142, 1989 ed., Primary Drinking Water Regulations and 40 CFR parts 264 and 270, 1987 ed.

e. National Handbook of Recommended Methods for Water-Data Acquisition, GSA-GS edition; Book 85 AD-2777, U.S. Government Printing Office Stock Number 024-001-03489-1;

f. Manual of Analytical Methods for the Analysis of Pesticide residues in Humans and Environmental Samples, 1980; Stock Number EPA-600/8-80-038, U.S. Environmental Protection Agency.

14. description of the flooding potential of the discharge site, including the 100-year flood plain, and any applicable flood

protection measures;

15. contingency plan for bringing the facility into compliance if permitted allowable limits are exceeded;

16. methods and procedures for inspections of the facility operations and for detecting failure of the system; and,

17. for any existing facility, a corrective action plan or identification of other response measures to be taken to remedy any violation of ground water quality standards or class TDS limits which has resulted from discharges occurring prior to issuance of a ground water discharge permit.

#### 6.4 ISSUANCE OF DISCHARGE PERMIT

A. The Executive Secretary may issue a ground water discharge permit for a new facility provided it is determined that:

1. The applicant demonstrates that the applicable class TDS limits, ground water quality standards and protection levels will be met or the Committee has approved an alternate concentration limit as described in R448-6-6.4(B). If the applicant requests approval to discharge a pollutant for which no ground water quality standard is established, the Executive Secretary shall, on a case by case basis, establish in the permit a limit for that pollutant that will protect public health and the environment;

2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;

3. the applicant is using best available treatment and methods to minimize the discharge of any pollutant; and,

4. there is no impairment of present and future beneficial uses of the ground water.

B. The Committee may approve an alternate concentration limit for a new facility if:

1. The applicant submits a petition for an alternate concentration limit showing the extent to which the discharge will exceed the applicable class TDS limits, ground water standards or applicable protection levels and demonstrates that:

a. the facility is to be located in an area of Class III ground water;

b. the discharge plan incorporates the use of best available technology;

c. the alternate concentration limit is justified based on substantial overriding social and economic benefits; and,

d. the discharge would pose no threat to human health and the environment.

2. The application has been forwarded to the Executive Secretary for review and recommendation.

3. One or more public hearings have been held by the Committee in nearby communities to solicit comment.

C. The Executive Secretary may issue a ground water discharge permit for an existing facility provided:

1. the applicant demonstrates that the applicable class TDS limits, ground water quality standards and protection levels can be met or the Committee has approved an alternate concentration limit as described in R448-6-6.4(D). If the applicant is discharging a pollutant for which no ground water quality standard is established, the Executive Secretary shall, on a case by case basis, establish in the permit a limit for that pollutant that will

protect the public health and the environment;

2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;

3. the applicant utilizes treatment and discharge minimization technology commensurate with plant process design capability and similar or equivalent to that utilized by facilities that produce similar products or services with similar production process technology; and,

4. there is no current or anticipated impairment of present and future beneficial uses of the ground water.

D. The Committee may approve an alternate concentration limit for a pollutant in ground water at an existing facility or facility permitted by rule under R448-6-6.2 if the applicant for a ground water discharge permit shows the extent the discharge exceeds the applicable class TDS limits, ground water quality standards and applicable protection levels and demonstrates that:

1. steps are being taken to correct the source of contamination, including a program and timetable for completion;

2. the pollution poses no threat to human health and the environment; and

3. the alternate concentration limit is justified based on overriding social and economic benefits.

#### 6.5 NOTICE OF INTENT TO ISSUE A GROUND WATER DISCHARGE PERMIT

A notice of intent to approve shall be published in a newspaper in the affected area and shall allow 30 days in which interested persons may comment to the Committee. Final action will be taken by the Executive Secretary following the 30-day comment period.

#### 6.6 PERMIT TERM

A. The ground water discharge permit term will run for 5 years from the date of issuance. Permits may be renewed for 5-year periods or extended for a period to be determined by the Executive Secretary but not to exceed 5 years.

B. In the event that new ground water quality standards are adopted by the Committee, permits may be reopened to extend the terms of the permit or to include pollutants covered by new standards. The holder of a permit may apply for a variance under the conditions outlined in R448-6-6.4(D).

#### 6.7 GROUND WATER DISCHARGE PERMIT RENEWAL

The permittee for a facility with a ground water discharge permit must apply for a renewal or extension for a ground water discharge permit at least 180 days prior to the expiration of the existing permit. If a permit expires before an application for renewal or extension is acted upon by the Executive Secretary, the permit will continue in effect until it is renewed, extended or denied.

#### 6.8 TERMINATION OF A GROUND WATER DISCHARGE PERMIT BY THE EXECUTIVE SECRETARY

A ground water discharge permit may be terminated or a renewal denied by the Executive Secretary if one of the following applies:

A. noncompliance by the permittee with any condition of the permit where the permittee has failed to take appropriate action in a timely manner to remedy the permit violation;

B. the permittee's failure in the application or during the

permit approval process to disclose fully all significant relevant facts at any time; or

C. a determination that the permitted facility endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination.

#### 6.9 POINTS OF COMPLIANCE

A. The Executive Secretary may issue a ground water discharge permit that includes compliance monitoring points where the applicable class TDS limits, ground water quality standards, protection levels or alternate concentration limits are to be met. The distance to the compliance monitoring points must be as close as practical to the point of discharge.

B. The Executive Secretary may adjust the location of the compliance monitoring point depending upon the hydrology, type of pollutants, and other factors that may affect the ground water quality. The compliance monitoring point shall not be beyond the property boundaries of the permitted facility without written agreement of the affected property owners and approval by the Executive Secretary, and shall not be located within the radius of influence of any beneficial use water supply.

#### 6.10 BACKGROUND WATER QUALITY DETERMINATION

A. Background water quality contaminant concentrations shall be determined and specified in the ground water discharge permit. The determination of background concentration shall take into account any naturally occurring degradation.

B. Background water quality contaminant concentrations may be determined from existing information or from data collected by the permit applicant. Existing information shall be used, if the permit applicant demonstrates that the quality of the information and its means of collection are adequate to determine background water quality. If existing information is not adequate to determine background water quality, the permit applicant shall submit a monitoring plan to determine background water quality to the Executive Secretary for approval prior to data collection. One or more up-gradient, lateral gradient, or other monitoring wells as approved by the Executive Secretary may be required for each potential discharge site.

C. After a permit has been issued background water quality contaminant concentrations shall be updated to reflect natural fluctuations in concentrations by including applicable up-gradient, and on-site ground water monitoring data in the ground water quality permit monitoring report.

#### 6.11 NOTICE OF COMMENCEMENT AND DISCONTINUANCE OF GROUND WATER DISCHARGE OPERATIONS

A. The permittee of a facility shall notify the Bureau of Water Pollution Control immediately upon commencement of the ground water discharge and submit a written notice within 30 days of the commencement of the discharge.

B. The permittee shall notify the Bureau of Water Pollution Control of the date and reason for discontinuance of ground water discharge within 30 days. If a discontinuance is due to a spill, leak, or other accidental release, the Bureau of Water Pollution Control must be notified immediately and a written explanation submitted within 5 business days.

#### 6.12 PERIODIC SUBMISSION OF MONITORING REPORTS

Results obtained pursuant to any monitoring requirements in the discharge permit and the methods used to obtain these results shall be periodically reported to the Executive Secretary according to the schedule specified in the ground water discharge permit.

#### 6.13 REPORTING OF MECHANICAL PROBLEMS OR DISCHARGE SYSTEM FAILURES

The permittee of a facility with a ground water discharge permit shall immediately notify the Executive Secretary of any mechanical or discharge system failures that could affect the chemical characteristics or volume of the discharge. A written statement confirming the oral report shall be submitted to the Executive Secretary within 30 days of the failure.

#### 6.14 CORRECTION OF ADVERSE EFFECTS REQUIRED

A. If monitoring or testing indicates that the permit conditions may be or are being violated by ground water discharge operations, the permittee for the facility shall promptly make corrections to the system to correct all violations of the discharge permit. The permittee and operator may be required to take corrective action to clean up the ground water and mitigate any adverse effects if the pollutant concentration has exceeded the applicable class TDS limits, ground water quality standard, alternate concentration limit, protection level, or other permit limitation.

B. Clean up standards for violation of permit conditions or other increases above the ground water quality standards, class TDS limits will be determined on a case by case basis until the Committee adopts a specific policy under Section 6.15.

#### 6.15 CLEAN UP STANDARDS - RESERVED

Note: The Committee intends to adopt a clean up policy for ground water in the near future. It is the intent of the Committee that the provisions of these regulations should be considered when making decisions under any state or federal superfund action; however, the protection levels are not intended to be considered as applicable, relevant or appropriate clean up standards under such other regulatory programs.

#### 6.16 DETERMINATION OF PROBABLE OUT-OF-COMPLIANCE STATUS

A. Determination of probable out-of-compliance status exists when the sample value for any one ground water pollutant exceeds the permitted limit, within the established laboratory quality assurance, in any one sample from the compliance monitoring point.

B. An accelerated schedule of monitoring and notification within 30 days to the Executive Secretary is required upon determination of probable out-of-compliance status. The accelerated schedule requires monthly or other periodic sampling as determined by the Executive Secretary of the compliance monitoring point for the pollutant for two months or until the compliance status of the facility can be determined.

#### 6.17 OUT-OF-COMPLIANCE STATUS

A. Out-of-compliance status exists when the value for any one ground water pollution exceeds the class TDS limits, applicable protection levels, ground water quality standards or alternate concentration limits for that pollutant in two consecutive samples from a compliance monitoring point, by two standard deviations as

calculated for the ground water pollutant at the compliance monitoring point or when statistically higher concentrations of a ground water pollutant occurs in samples from a compliance monitoring point over that of the permit limit. The statistical significance shall be determined using the statistical methods described in Statistical Methods for Evaluating Ground Water Monitoring Data from Hazardous Waste Facilities, vol, 53, No. 196 of the Federal Register, Oct. 11, 1988.

#### 6.18 PROCEDURE WHEN A FACILITY IS OUT-OF-COMPLIANCE

A. If a facility is out of compliance the following is required:

1. The permittee shall notify the Executive Secretary of the out of compliance status within 24 hours after detection of that status, followed by a written notice within 5 days of the detection.

2. The permittee shall institute an accelerated monitoring schedule requiring at least monthly sampling for two months and monthly sampling thereafter or on a sampling schedule determined by the Executive Secretary until the facility is brought into compliance.

3. The permittee shall prepare and submit within 30 days to the Executive Secretary a plan and time schedule for assessment of the source, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain ground water quality and insure that the ground water quality standards will not be exceeded at the compliance monitoring point.

4. The Executive Secretary may require immediate implementation of the contingency plan submitted with the original ground water discharge permit in order to regain and maintain compliance with the permit limit standards at the compliance monitoring point.

#### 6.19 GROUND WATER DISCHARGE PERMIT TRANSFER

A. The permittee of a ground water discharge facility which is operating pursuant to an approved ground water discharge permit shall give written notice to the Executive Secretary of any transfer of the ground water discharge permit, within 30 days of the transfer.

B. The notice shall include a written agreement between the existing and new permittees establishing a specific date for transfer of permit responsibility, coverage and liability from the existing to the new permittee.

#### 6.20 ENFORCEMENT

A. These regulations are subject to enforcement under Section 26-11-16 of the Utah Water Pollution Control Act.

#### 6.21 HEARING AND APPEALS

A. Any person may request a hearing before the Committee who:

1. is denied a permit by rule by the Executive Secretary under R448-6-6.2;

2. objects to a discharge limit established by the Executive Secretary;

3. objects to conditions or limitations proposed or established by the Executive Secretary in the ground water



discharge permit; or

4. objects to monitoring, sampling, information, or other requests or requirements made by the Executive Secretary;

B. Any person who is denied a permit or whose permit is proposed to be terminated or revoked by the Executive Secretary may appeal that decision to the Executive Director of the Department of Health pursuant to Section 26-11-13(2).

**KEY: water pollution, ground water**  
**1991**

**26-11**



## **ecology and environment, inc.**

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International Specialists in the Environment

TO : Mike Zimmerman, EPA  
FROM : Scott Keen, E & E TAT **SK**  
DATE : August 18, 1992  
SUBJECT : Trip Report for Richardson Flat Tailings Site, Summit County,  
Utah, TDD T08-9204-015, PAN EUT0039SBA.

Enclosed please find four copie of the Richardson Flat Tailings Site Trip Report. Two copies have actual photographs. Two copies have photocopies of photographs. Please call me if you have any questions or comments.

DOC ID # 7177  
PAGE #

**Contact the Superfund Records Center to view this document.**

SITE NAME Richardson Flat Tailings

OPERABLE UNIT \_\_\_\_\_

REPORT OR DOCUMENT TITLE Trip Report

DATE OF DOCUMENT 8/17/1992

DESCRIPTION OF IMAGERY Color photos

NUMBER AND TYPE OF IMAGERY ITEM(S) 32 Photos